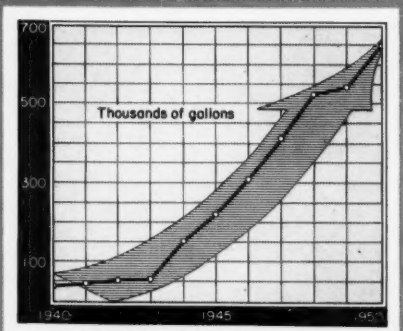
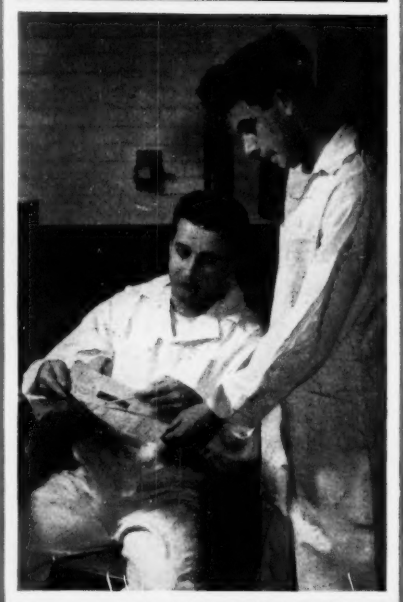
Chemical Industries Week

March 10, 1951
Price 35 cents





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Chemical Industries Week

March 10, 1951

Volume 68 Number 8

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OPINION . . . . .

Chemical Earnings

To THE EDITOR: Please refer to page 12 of your issue of February 17, and the listing there of certain statistics regarding Nopco Chemical Company.

We call your attention to the notation ".7d" appearing under Common Dividends, 1950. From your explanation of abbreviations at the bottom of the page, "d" means deficit.

We assume that this is an error since the dividend disbursements of Nopco during that year amounted to $3.00 per share and a 10% stock dividend.

T. A. PRINTON
President
Nopco Chemical Company, Inc.
Harrison, N. J.

True. CIW is sorry for a typographical error wherein a "d" for deficit ousted an "a" for stock dividend. The figures, of course, were correct.—ED.

Table of Contents

To THE EDITOR: . . . I have read with interest the first issue of the weekly. As you are aware the average businessman in the industry cannot afford to read more than one weekly publication. No doubt you feel your present format is very cute in that it requires your readers to read your publication from cover to cover to get an idea of what it contains since no adequate Table of Contents listing the separate items is published.

Until such time as you see fit to provide an adequate Table of Contents giving a one-sentence title for the items . . . which makes it possible to select from the Table of Contents those items of individual interest, I shall continue to rely on other magazines for coverage in this field. . . .

J. J. O'CONNELL
Shell Development Company
Emeryville, Cal.

These are the considerations CIW had to evaluate before deciding on a one column Table of Contents instead of the two columns required to list each article in any issue: (1). Could article content be highlighted more conveniently for the reader by running a fast-reading bold face summary paragraph at the beginning of each article rather than by a Table of Contents' listing? (2). How much more value could be given readers by utilizing that weekly extra column in various departments?

A column of editorial space per week is precious, means 52 columns (or more than 17 pages) a year. That's equivalent to, for instance, two additional CIW Reports or a comparable additional quantity of material in Research, Production, Specialties, etc. Hence the single column Table of Contents.

We eschew being "cute," are trying merely to deliver a larger amount of more useful material to our readers.—ED.

Rapid Reading

To THE EDITOR: I would like to express my disagreement with the letter in the February 17, 1951, issue, written by Mr. Walter C. Durfee.

I am a technical librarian. Part of my duties consists of scanning all periodicals which we receive in order to determine which articles are of interest, not just to one person, but to approximately 150 people.

I assure you I do not have to spend one hour and twenty minutes total time on each issue of CHEMICAL INDUSTRIES WEEK, although I scan it for all these people . . . read that which is of particular interest to me, and abstract items of special interest, write for further information about some of them.

. . . Rapid reading is the key. . . .

NAME WITHHELD

The complaint: ". . . it takes about 20 seconds to discover the topic of each article . . . about one hour and 20 minutes to truly search the edition for topics only . . . See below—ED.

To THE EDITOR: . . . A few weeks ago I wrote you a rather bitter letter criticizing the new CHEMICAL INDUSTRIES WEEK. I'd like you to know, however, that there are also nice things that I can say. . . .

. . . I clipped eight articles out of your most recent issue . . . passed them along to my associate for follow-up. . . .

WALTER C. DURFEE
Boston, Mass.

Rubber Bonding

To THE EDITOR: We read with interest your article appearing in CHEMICAL INDUSTRIES WEEK, (Feb. 10)—"Brassless Bond."

The practice of vulcanizing rubber to metal has for many years been a much practiced art in the United States and to a lesser extent in most foreign countries. There are numerous ways of accomplishing this without brass plating.

One of the most popular systems is the use of Ty-Ply adhesives which

were introduced to the market twelve years ago by our corporation.

ROBERT SHATTUCK
Vice-President
Marbon Corporation
Gary, Ind.

CIW agrees–in part. We said: "Adhesives have been developed which do away with brass-plating, but they . . . require expensive equipment to vulcanize rubber in contact with metal. The new process is . . . for bonding already vulcanized rubber and metals."–ED.

Up and Down

TO THE EDITOR: . . . I say down with the editor and three cheers for Reader Zimmerli . . . (Whose comments on our report on allethrin were published Feb. 17.–Ed.)

The new and smaller magazine is an improvement. The contents are more up to date, and a smaller magazine is less likely to be set aside for a more convenient reading period. . . .

G. H. HARRIS
Richmond, Virginia

No comment–from a semi-castigated editor–ED.

Systemic Insecticides

TO THE EDITOR: With reference to your article on systemic insecticides (Self-Defense for Plants, Feb. 24), it is my opinion that these products will undoubtedly find a place in protecting plants from insect damage. Even at this preliminary stage of development their use on ornamental plants, nursery stock, shade trees and forest plantations would seem reasonable. They could be applied more readily than conventional sprays. . . .

. . . However, these compounds are violent poisons . . . we do not know enough about them to release them for general use. The public must be constantly warned of the dangers . . . they should not be used on edible produce or livestock feed. . . . Feeding tests will have to be extended over many months, if not years, to permit toxicological evaluation. If the conventional sprays on crop plants have been a cause of concern these materials are infinitely more serious. . .

Most of the new insecticides operate as enzyme poisons. As such, many of them are receptive to sulfhydrol groupings irrespective of whether they occur in the plant or the pest attacking it. Numerous side reactions are to be expected . . . they are undoubtedly responsible for the detoxification processes that were alleged in your report. . . . The labeling of systemic toxicants with key radioactive atoms will also prove to be of great value in future research . . . will permit detailed studies of solute penetration and translocation within the plant.

There are two sweeping generalities in the article that probably represent over-enthusiasm. There is no valid reason for assuming that resistant strains of insects will not appear in the course of time. There will be, undoubtedly, variations in inherent resistance to these new chemicals, as there has been to all other chemicals. As the weaker members of a population are killed, the more resistant type will become dominant and multiply.

Finally, it will be surprising if virus diseases are controlled adequately. Some control always occurs where vectors are destroyed . . . but a single vector must feed only a few seconds before salivary secretions are ejected onto the plant . . . virus particles will be established. The systemics are neither instantaneous insect killers nor repellents so they should not be materially better than standard spray treatments for this purpose.

. . . We all welcome the opportunity for intensive research in a promising new field . . . but we should not be carried away with undue expectations . . . DDT did not prove to be the solution to all insect problems as many expected in the early days.

The most immediate problem is ascertaining the persistence of systemics in plants and the fate of their degradation products. Once these problems are solved the systemics may be expected to take their rightful place in our arsenal of chemicals to fight the ever-increasing horde of plant pests.

GEORGE L. MCNEW,
Managing Director,
Boyce Thompson Institute for Plant Research, Inc.
Yonkers, New York

Reader McNew has highlighted some important points on the highly controversial subject of systemic insecticides.

For a valued opinion of our report and a penetrating analysis of the outlook, CIW's thanks.–ED.

CIW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
Address all correspondence to: The Editor, Chemical Industries Week, 330 W. 42nd St., New York City.

Make H_2SO_4 from H_2S

WITH A CHEMICO PLANT

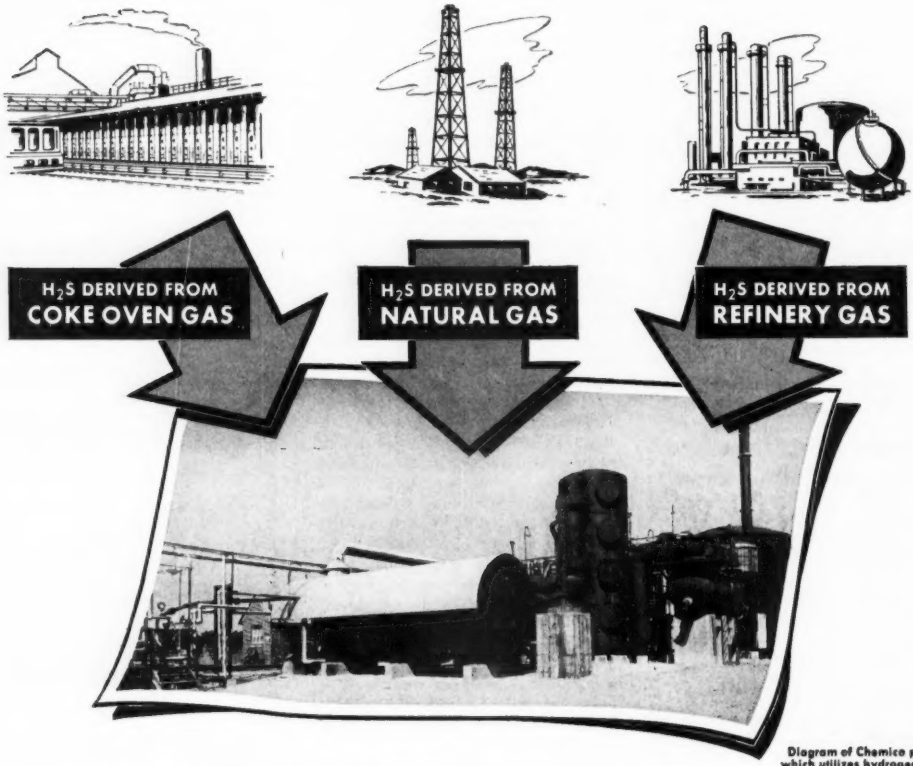
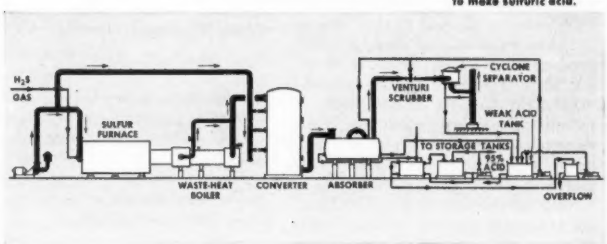


Diagram of Chemico process which utilizes hydrogen sulfide to make sulfuric acid.



Now that raw sulfur is in short supply, it has become necessary to manufacture sulfuric acid from other raw materials such as hydrogen sulfide. If you have hydrogen sulfide available, it will pay you to investigate Chemico's practical and proven process for making H_2SO_4 from H_2S. Chemico's new type sulfuric acid plant is especially well suited for this purpose. Or existing sulfuric acid plants can be converted.

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CC213

Chemico plants are profitable investments

Chemical Industries Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Production of cold rubber at the B. F. Goodrich-operated RFC plant at Port Neches, Texas, will be upped 50% within 60 days. The Government has authorized $350,000 for refrigeration equipment to boost output from 30,000 to 45,000 tons a year.

Bay Chemical Co. (Weeks Island, La.) will make microspherical cracking catalyst from steel mill slag, obtaining raw material from the Birmingham, Ala., area. Initial treatment of the slag with hydrochloric acid will be used to adjust the ratio of alumina to silica.

Bead catalyst for Thermofor-type cracking units will also be manufactured by the company.

More chemical competition from abroad is implied in a bill introduced by Senator Malone (Rep., Nev.) providing for flexible import fees to replace the trade agreements act that expires in June.

The chemical industry is keenly watching the bill's progress, for Malone says his bill would establish American markets for goods of every nation on the basis of fair and reasonable competition.

A nine-man coke-oven industry advisory committee, appointed by Price Stabilizer DiSalle, will consult with and advise the Office of Price Stabilization on the preparation of regulations and orders.

Secret of Hypermatic compressible fluids, first used by Nordstrom Valve Division as plug valve lubricants: Compressibility is achieved by emulsifying a gas in the lubricant fluid. Watch for further applications of these materials.

Cleaning windows without water is the aim of a new product now being developed by Minnesota Mining & Manufacturing Co. It consists of a very fine abrasive on soft paper.

The contract renegotiation bill (H. R. 1724) is now in conference, where differences between the House-passed and Senate-passed versions will be ironed out. House version exempts contracts and subcontracts of $100,000 or less; Senate would up this to $500,000.

Add another state to the roster of those approving fluoridization of drinking water to reduce incidence of tooth decay: Minnesota State Dental Association has just approved it for community water supplies.

ECA has authorized Greece to use Marshall Plan funds to buy half a million dollars worth of rubber and rubber products (except natural rubber) and $400,000 worth of drugs and pharmaceuticals. The goods, to be purchased in the U.S., must be bought by June 30.

Du Pont has been making some special nylon in which sebacic acid (ten carbons) replaces adipic acid (six carbons) in the polymer.

Now a patent (U. S. No. 2,524,833) reveals how the acid can be made from butadiene—same starting material as is used for ordinary nylon.

Addition of chlorine gives 1,4-dichlorobutene-2, which upon treatment with hydrogen cyanide in the presence of calcium carbonate and copper bromide gives chlorobutenyl cyanide. Two molecules of the latter condense in the presence of nickel carbonyl to give 1,8-dicyano-2,6-octadiene. Partial hydrogenation gives sebaconitrile.

Barium carbonate has been added to NPA's basic chemical order, M-32. No producer will be required to accept defense orders for more than 20% of any month's scheduled output. Reason for the squeeze: greatly increased postwar use in manufacture of glass television tubes.

At the same time NPA said that rated orders for melamine-containing products would not have to be accepted by the manufacturer less than 15 days before first of the month in which delivery is requested.

Winthrop-Stearns's production of Aralen antimalarial, now 110,000 lbs. a year, will be boosted 140% in July, up to 265,000 lbs. Even the present rate of production represents a tripling since the Korean war started. Hilton-Davis will supply the intermediates. The compound is 7-chloro-4(4-diethylamino-1-methylbutylamino) quinoline diphosphate. U. S. military forces now use it instead of Atabrine.

Oil drillers will get top priority for equipment—specifically, 1,890,000 tons of pipe, leaving that much less for lower-priority users to finagle for. Petroleum Administration for Defense convinced National Production Authority that the oil industry must drill 43,400 wells this year, and NPA is now setting up a program, effective in April, to enable steel mills to provide sufficient amounts of tubular goods.

PAD will work with NPA to keep the program rolling, and both agencies are developing a set-up for distribution to operators, starting in July. PAD will shortly announce an emergency plan to supply pipe to wildcatters who will need it before planned distribution takes effect.

Industrial glassware makers complain to NPA that while zinc oxide, lead, soda ash and selenium aren't acutely scarce, they're having allocation problems with their suppliers.

Only serious shortage reported is of boric acid, of which the glassware industry is the largest user (heat-resistant, borosilicate glasses). Tight supply can be traced to lack of sufficient sulfuric acid.

Manufacturers of blueprint and other sensitized papers fear they will be stymied by chemical shortages, have warned NPA that industrial expansion may be slowed by contractors' lack of blueprint paper.

Chemicals they're having trouble buying: sulfuric acid (for production of other chemicals), zinc chloride and resorcinol (diazo type papers), thiourea (preservative and print fastener), diethylene glycol (anti-curl agent), potassium bichromate (blueprint paper), citric acid and glycerine.

. . . The Editors

WHAT'S NEW . . . . . .

Pulsating Petrochemicals

Plant construction for the production of chemicals from petroleum is booming again after a two-year lull.

Included in the boom, in addition to chemical companies, are nearly all petroleum refiners and one transcontinental natural gas pipeline.

Major chemicals not heretofore generally derived from petroleum include acetylene, benzene and hydrogen cyanide.

Construction of new facilities for chemical production from petroleum approached the stopping point only one year ago. Today it is again booming—but with a difference.

Not only is production capacity for such long-time petrochemicals as ethanol, acetic acid, ethylene glycol, and vinyl intermediates being expanded, but capacity for several materials not hitherto derived from petroleum hydrocarbons is tapping industry's till for hundreds of millions of dollars.

In addition to the older intermediates, ethylene and propylene, raw material producers will also make acetylene, benzene and hydrogen cyanide from petroleum. These intermediates are now being produced largely from other sources.

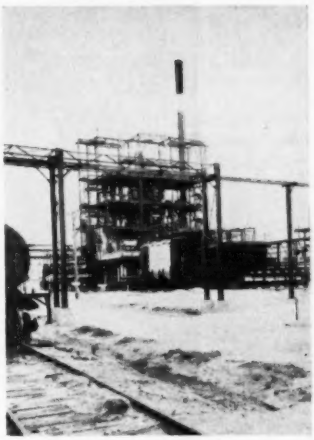
Refiners: A sizable portion of the new capital will be supplied, not by chemical companies but by petroleum refiners. With Sinclair's formation of a petroleum chemicals division and Gulf's construction of ethylene and iso-octyl alcohol units, all major petroleum refiners except Sun, Richfield, Pure,* and Tidewater will have invested heavily in production of chemicals from petroleum hydrocarbons. Their dollars-and-cents interest is either expressed directly, as is the case of Shell and Esso, or as a joint undertaking, like Jefferson Chemical, owned jointly by Texas and American Cyanamid.

Pipelines: Another interesting development is the tie-up between a transcontinental natural gas carrier, Tennessee Gas Transmission Co., and Mathieson Hydrocarbon Chemical Co. Tennessee will carry two- and three-carbon hydrocarbons in its natural gas and remove them at a Kentucky location for sale to Mathieson, which will convert them to ethylene glycol, ethylene oxide and ethylene dichloride by the chlorhydrin route. The outcome of this experiment will be watched with interest by the whole industry. Its success might presage a shift in preferred plant location from the Texas Gulf Coast to the Middle West.

Acetylene is at last to be added, after one of the longest and most costly research studies that industry has ever undertaken, to the petrochemical roster. Pioneering this new industry is Monsanto Chemical Co., whose new plant to be built at Texas City, Texas *(CI, Dec. 1950, p. 875)*, will use the so-called Sachse process for partial combustion of natural gas to produce acetylene. Acetylene from this plant, probably the forerunner of other plants of this type, will be used to make acrylonitrile for synthetic fibers.

Industry has been slow to embrace thermal cracking of natural gas hydrocarbons to acetylene; many experts are not convinced that such units will make acetylene more cheaply than the time-honored calcium carbide route.

In addition to the Monsanto plant, Wulff Process Co. is erecting a small demonstration plant near Los Angeles, Calif., to produce acetylene by regenerative cracking of hydrocarbon raw materials. Some hold the view that this variation of hydrocarbon cracking will provide the cheapest hydrocarbon-based acetylene. However, an economic unit is extremely large and the refractory still remains a problem despite extensive pilot-plant operations.



HYDROGEN CYANIDE: New generation of petrochems.

Benzene, now being produced from petroleum on a small scale, will soon become a major product, shooting up from the current 12 million gallons a year to 100 million, if the Government's defense plans are fulfilled.

In this case, at first at least, it will not be competitive with coke-oven benzene which less than a year ago was selling for only 21¢ per gallon; it is expected that the petroleum-derived material will be selling for something above 50¢ per gallon. Benzene is being produced from petroleum only because demand has reached the point where a new source of supply had to be found.

Production of benzene will make available large volumes of cuts for fractionation into other aromatic hydrocarbons such as toluene and the three xylenes. And there is a much better possibility that the cost of these materials, unlike that of benzene, will approach current price levels.

Hydrogen cyanide has been produced on a commercial scale by Rohm & Haas Co. from methane and ammonia for some time. However, four

* Although not producing chemicals, Pure has developed a process for producing carbon bisulfide from petroleum hydrocarbons and sulfur, which has been licensed to Barium Reduction Co.

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*By Government authorities responsible for inventory control under the National Defense Act.

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other plants to use this process are currently under construction. Du Pont, which operated a pilot unit at El Monte, Calif., during World War II, has nearly completed one unit at Victoria, Texas; and another has been started at Memphis, Tenn., where the hydrogen cyanide will be used to produce sodium cyanide. Monsanto is building a plant at Texas City in conjunction with its acetylene unit for acrylonitrile production. Carbide & Carbon is putting up a plant at Institute, W. Va., also for acrylonitrile production, and additional units are reportedly well past the conversational stage.

Hydrogen cyanide is becoming one of the most important chemical intermediates in the chemist's bag of tricks. It is a polyfunctional molecule offering a gamut of possibilities in synthesis. A major problem heretofore has been its relatively high price.

Korea: A large portion of the present expansion can be laid at the door of the Korean crisis. Still, much of it represents the natural outgrowth of long-term trends that have simply been accentuated by the current call for high production. For example, the increasing use of blackstrap molasses as a feedstuff, and at a high unit value, presaged a further expansion of synthetic ethyl alcohol. The only question remaining was when the increase would take place *(CI, Oct. 1950, p. 558)*. Two plants are now under construction and two more are getting out of the "gleam-in-the-planner's-eye" stage. Excluding synthetic rubber demands for alcohol-based butadiene, completion of the two units now under construction will make nearly 75% of industry's total requirements dependent upon synthetic alcohol.

Ethylene glycol production capacity should remain stationary for some time to come after Mathieson Hydrocarbon Chemical's plant is completed. There is an excellent possibility, however, that new ethylene oxide units will be required in the rather near future.

Growing tetraethyl lead needs are forcing production of ethyl chloride to ever-new highs, while the ever-expanding uses of vinyl resins are continually creating new demands for vinyl chloride, both acetylene-based and from cracking ethylene dichloride. Some measure of the expansion to be expected in chlorine-derived products is found in the chlorine industry's current 25% expansion of plant capacity *(CIW, Feb. 3, 1950)*. And most of this new capacity will be utilized for the production of chemicals from petroleum-derived intermediates.

Crystal ball: Two years ago CI *(March 1949, p. 378)*, in speaking of petrochemicals, concluded that "supply has finally caught up with demand, giving industry time to pause and digest the huge expansion of the past few years before spawning . . . new products, new processes and increased supplies of present products."

The spawning season has arrived.

Geigered Hay

Use of radioactive phosphorus is producing tangible results in fertilizer and plant nutrition research. With its help, three University of Minnesota scientists have demonstrated the value of fertilizers in increasing the food value of crops as well as yields. Results will influence fertilizer manufacture.

Radioactive materials have opened up an entirely new field of soil research. In the past, effectiveness of fertilizers has been measured largely by their influence on yield. It was impossible, however, to determine how much of a nutrient in the plant came from the fertilizer and how much from the soil. Now, for the first time, the uptake and relative availability of applied fertilizer nutrients can be definitely determined by radioactive tracing.

Investigations with radioactive phosphorus fertilizers expanded from a few experiments in two states in 1947 to 67 experiments in 22 states and Canada last season.

The Minnesota experiment was started at the Rosemount, Minn., Agricultural Experiment Station in the spring of 1950 by A. C. Caldwell and J. M. MacGregor, associate professors of soils, and Andrew Hustrulid, professor of agricultural engineering.

The scientists broadcast two kinds of radioactive phosphate fertilizer on established stands of alfalfa: superphosphate, in which all the phosphorus is presumably readily available; and fused rock phosphate, first heated to a high temperature to make the phosphorus more available. The fertilizer was applied at two rates, 40 and 120 pounds of P_2O_5 per acre. These rates are equivalent to 200 and 600 pounds of 0-20-0 fertilizer.

Samples of alfalfa were cut at three stages of growth, dried, ground, compressed into small round briquettes. Their radioactivity was then measured with a Geiger counter.

Superphosphate best: It was found that the young alfalfa plant took up about seven times more phosphorus from superphosphate than from the fused rock phosphate. This difference gradually lessened until, at blossoming, the alfalfa growing on superphosphated plots contained only about three times as much phosphorus.

The heavy rate of fertilizer supplied two to three times as much phosphorus to the plant as the lighter rates of application. And results showed that plants took up substantial proportions of their phosphorus content from the fertilizer. Superphosphate at the heavy rate supplied over one-third of the phosphorus in the plant; at the lighter rate, only about one-fifth.

Fused rock phosphate at heavy and at light rates was much less effective

MAKING HAY: Radiation clicks proved superphosphate's worth.

in providing phosphorus for the plant.

Not only did the fertilizer increase the yield of hay (superphosphate by half a ton), but the total phosphorus content of the alfalfa was increased as well.

Practically speaking, these results mean: (1) Fertilizer broadcast may increase phosphorus content of the plant as well as the yield, with consequent increase in food value. (2) More available forms of phosphate fertilizers are more effective in supplying phosphorus to the plant. (3) Since applied phosphorus is effective in supplying a large part of the plant's needs, soil and phosphorus is conserved.

Significance to the chemical industry: more emphasis in all likelihood, by soil experts and agricultural advisers, on the more soluble chemically processed phosphate fertilizers, a swing away from application of unprocessed phosphate rock.

Glass-Plastic

New glass fiber polyester plastic, equivalent to light-weight steel in strength, is getting a warm welcome from the Air Force. Developed primarily for use in military aircraft, the material can relieve many home front headaches as a substitute for defense-scarce aluminum and light steel in a variety of products.

Glass fiber polyester laminates and fiber glass reinforced sheet are not new in themselves. Their high strength, low weight, and ease of fabrication has been put to good use, time and again, since World War II. But they had one serious failing, low moisture resistance. On immersion, or continued exposure to high humidities, fiber glass plastics would lose as much as 50% of their mechanical strength. Obviously, application was limited to indoor and shielded locales.

Today, it is a different story. The combined talents of Engineering Div. Materials Laboratory (Air Materiel Command, Wright Field, Dayton, Ohio), Bjorksten Research Laboratories, Pittsburgh Plate Glass Co., Monsanto Chemical, Glass Fibers, Inc., Owens-Corning Fiberglas Corp., Libbey-Owens-Ford Glass Co., and American Cyanamid, have succeeded in producing fiber glass plastic laminates and sheets, of superior strength—and moisture proof too.

Weakness of the old materials was traced to the poor adhesion between glass fibers and plastic. The deficiency was not noticeable while the material was dry.

But when wet, all was lost. Apparently an auxiliary substance was needed to tie the glass to the plastic. Finding such a substance was easier said than accomplished.

Missing link: Intensive and well conceived research did the trick. The missing link in the glass-to-plastic chain was vinyl chlorosilane. The vinyl chemical is applied to the glass fiber and doused with water. Apparently the chlorine atom is hydrolyzed off; silicon end of the residual structure attaches to the glass and the vinyl nucleus participates in polymerization of the resin. Result is virtually a molecular bond, one end of which grips glass; the other joined tightly to plastic. Final product stands up to water with no trepidations as evidenced by repeated tests under the most unfavorable conditions (i.e. boiling for 3 hours).

Tests conducted with principal commerically available resins showed that the treatment is applicable regardless of the particular new polyester employed. Vinyl chlorosilane may be applied in vapor phase, or incorporated into a suitable immersion solution.

Bullet stopper: Fiberglass reinforced plastic sheets and laminates produced by the improved process will stop a machine gun bullet at close range. More important to the process industries, they will substitute for thin steel in many jobs where the full strength of steel is not essential. Refrigerators, stoves, washing machines, auto parts, filing cabinets, etc. are only a few of the possibilities. Even the building industry will benefit, according to manufacturers of the glass-plastics. If they're right, living in glass houses may soon be more than an idle phrase in a oft-quoted maxim.

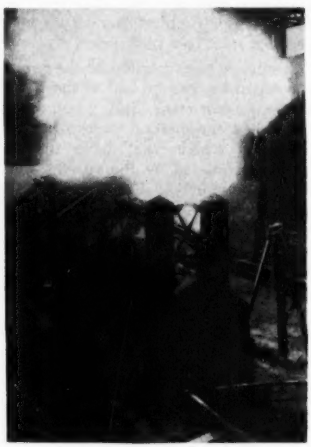
Basic Need

A revolution in the refractory market is in the making. Basic refractories (high in lime and magnesia) bid well to replace acidic refractories for lining foundry cupola furnaces.

Initial cost of basic refractories is about three times the cost of the acidic refractories. But the development of ductile nodular cast iron by International Nickel Co., when combined with armament demands for low-sulfur gray iron castings, has caused foundry owners to heed the sales pleas that marketers of basic refractories have been reciting to them for many years.

Latest to join the parade is Laclede Steel with two 84-inch cupolas at its Alton, Ill. plant. These are to go into operation this month, lined with basic refractory materials furnish by Basic Refractories, Inc. Laclede has no blast furnace and melts only scrap iron and coke in its cupolas to provide charging stock for the open hearths. The open hearths formerly removed the sulfur but most of the desulfurizing will now be accomplished in the cupolas.

Basic refractory materials, being high in magnesia and lime, are not affected by the limestone in the cupola charge. The magnesia, however, combines with the sulfur content of the iron to provide a low-sulfur iron at the taphole. With the need to use



BESSEMER CONVERTER: Next target for basics.

lower-grade coke, whose high sulfur content eventually appears in the melt, this property of basic refractories assumes ever-increasing importance.

Sulfur removal is a must for producers of the new ductile nodular cast iron as it combines with the magnesium added to produce the ductile cast iron. With an acid lining this must be done by adding soda ash to the molten iron as it pours from the furnace into the ladle. But soda ash is hard on ladle linings. Use of basic refractories rids the iron of sulfur without soda ash.

Too, only in a basic-lined cupola can excess phosphorus be readily removed from the iron.

It all adds up to a superior product from a furnace that has higher productivity because of lower down-time for relining and patching. Basic re-

fractory producers' pencil work indicates that, despite the higher initial cost, basic lining materials are less expensive over a period of time.

To chemical people it means new and sizable demands for lime and magnesia to produce the basic refractories.

Still waiting to be tackled by makers of basic lining materials are the bessemer furnaces. How to remove the sulfur from bessemer-produced steel has long been the No. 1 problem in the steel industry. Research and development work is under way with a turbo-hearth lined with basic refractories, but use of basic refractories has yet to be accepted.

Peels Porcelain

Fabricated rejects enameled with porcelain are diverted from the junk pile to New Process D-Enameling Corp., for stripping. Returned in better shape than ever, they are re-enameled and used. Or used porcelain enameled steel can be treated for recovery of scrap.

This patented process is a direct reversal of the long-established belief that porcelain enamel could not be profitably removed from fabricated steel. Inspection rejects were written off as a complete loss—not even vendible as scrap.

But Arthur M. Lander, 35-year-old president of New Process D-Enameling Corp., confessing, "I was just dumb enough not to take advice from the experts," refused to believe it couldn't be done. The new process is the fruit of his refusal.

Rejects are shipped to New Process by Cribben Sexton, Nash-Kelvinator, American Stove Co., Norge Div. of Borg.-Warner, and other appliance manufacturers. Parts are stacked in an open-frame metal basket and lowered into the stripping tank. The stripping solution, roughly 50% caustic soda with small amounts of sodium silicofluoride and a wetting agent, removes the porcelain after two hours immersion at 300 F. The parts are then removed, sandblasted, and dried for return shipment.

Returned to the manufacturer, they are refinished, inspected, and pass to the assembly line. Appliance manufacturers report that these treated parts take enamel even more readily than newly fabricated parts. Recovery of formerly useless scrap is saving tons of hard-to-get steel and at the same time is salvaging already fabricated metal. The timeliness of the process is obvious in view of increasingly rigid end-use controls being imposed by the government.

The government itself is negotiating a contract with New Process, which may run to $1 million, to de-enamel and refinish gasoline and water cans. New Process has just bought a 2½ acre plot with three buildings totaling 30,000 sq. ft. under roof in Aurora, Ill.

The government is also considering salvage of used porcelain steel. Lander states that this is economically feasible if scrap can be collected at central points. He indicates that should the government want to expand this possibility, he will license his patent where necessary.

Lander was 17 years old when first employed as a pickling room helper by Cribben & Sexton, now one of his customers. There he became aware of the appallingly huge discard heap of damaged parts. During these years, he had been studying ceramics at Lewis Institute (now Illinois Institute of Technology), and with this background he rolled up his sleeves and tackled the problem.

After forming the Lawndale Enameling Co., to put porcelain on, he spent his spare time working on the problem of taking it off. The resultant process was patented, and the New Process subsidiary of Lawndale was formed in 1949. Operating in the red during its first year, it is now in the black and promises to outdo the parent company. Combined business volume of the two was $600,000 in 1950 and book value of the closely held shares has climbed from $7.50 to $38 in just five years.

New Process is worth watching. On its own, it has come up fast enough, but with what it has to offer the government in the present materials shortage, there's no predicting how far it will go.

"Gray" Cortisone

Sales representatives of Merck & Co. are now on the lookout for "gray" markets and price kiting in the sale of Cortone—Merck's brand of cortisone. Suspicious cases will be reported directly to the company which has promised to do all in its power to correct unscrupulous practices.

Real problem is the tremendous demand for cortisone which cannot be satisfied by present production methods. According to Merck, a more plentiful starting material (than cattle bile), or a complete new synthesis, will have to be discovered before cortisone can be made in sufficient quantities.

Platforming Score

Universal Oil Products Co.'s Platforming process, which converts cyclohexane and methylcyclopentane in naphthenic petroleum feed stocks to benzene, is being adopted by more and more refineries.

While it was designed to increase yield and improve anti-knock rating of gasoline by increasing the proportion of aromatics (and thus, incidentally, conserve tetraethyl lead), it can produce by-product benzene from the relatively few crudes that are especially rich in naphthenes.

One Platforming unit is in operation: Old Dutch Refining Co., Muskegon, Mich.

Eight more are under construction:

Kendall Refining Co.
Bradford, Pa.

Johnson Oil Refining Co.
Cleveland, Okla.

Mid-West Refineries, Inc.
Alma, Mich.

Premier Oil Refining Co.
Fort Worth, Texas

Bell Oil & Gas Co.
Grandfield, Okla.

Aurora Gasoline Co.
Detroit, Mich.

Taylor Refining Co.
Port Isabel, Texas

Petroleym Specialties, Inc.
Detroit, Mich.

Still another five are in the design stage:

Shell Oil Co.
Houston, Texas

Shell Oil Co.
Wood River, Ill.

Standard Oil Co. of Calif.
El Segundo, Calif.

Bitumen & Oil Refineries
(Australia) Ltd.
Australia

Canadian Oil Refineries Ltd.
Froomfield, Ont.

This adds up to a total of fourteen units now operating or in various stages of design and construction.

Monomer Mart

Over 200 new monomers are available—and more are becoming so weekly—from the stocks of infant Monomer-Polymer, Inc. Being the only U.S. source for a majority of these, the firm counts on specialization as a tool to hold some of the largest companies in the chemical industries as customers. Repeat orders and consequent lower prices—rather than high-cost custom synthesis—are the nub of future policy.

Like the medical specialist as compared with the general practitioner, Monomer-Polymer concentrates on doing one thing: supplying the plastics and rubber fields with research and pilot-plant quantities of monomers with possibilities. It also undertakes research and original manufacture of any monomer requested that is not in stock.

Diligence and painstaking attention to detail during production runs requiring up to sixty hours has paid off, succeeding in some instances where others following the same instructions have failed.

Not a snap: Occasionally, however, an illogical slip-up will occur that is heart-breaking as well as costly. A paper weight now on M-P Founder Jack Zomlefer's desk represents $2,000 in materials and time. This monomer was never sold as intended—it polymerized into a solid in the bottle. Annoyingly enough, he has tried to do it deliberately again and can't.

With the glass bottle cracked off long ago, this lumpy fiasco serves as a constant reminder that every minor detail of operation—even to the type of cap used on the bottle—must be written down. The monomer business depends far more on experience than on theory and literature—it's more perspiration than inspiration. In any case purity of product is essential, for even a minute quantity of another monomer often results in undesirable reactions.

M-P originally made, on a single-order basis, chemical oddities that were not commercially available. Such products are costly because of the small quantities and research overhead involved.

Repeat orders sought: For this reason, the firm is now trying to emphasize repeat orders, so that larger-quantity production and fewer research hours will permit lower prices. In most cases, M-P's experience allows it to extrapolate and recommend a combination of monomers that will give the kind of polymer needed by a customer.

Jack Zomlefer recognized the need for an organization like Monomer-Polymer while he was working for Rubber Reserve during the war. Critically-needed monomers had to be tracked down to companies all over the country. When they weren't available at all—which was usually the case—government laboratories had to spend precious hours researching on how to make them, and then more hours making them. A hearty hand would have been extended at that time to any company which would be a single source for monomers.

ZOMLEFER AND HALPERN: Concentrating on one thing.

This ghost of an idea haunted Zomlefer all through his doctorate work. In fact, upon receiving his Ph.D. in August, 1948, he talked it over with a friend long in the chemical field, who advised against it predicting he would soon fail, having no business experience.

A month later, Zomlefer was in business with a $2,000 stake. It meant beans on the dining table, but he went to work building shelves, being his own secretary, installing plumbing, and blowing his own glass apparatus in an old firetrap of a store near Chicago's Skid Row. Between production runs, he spent his time convincing the fire inspector that all was well and that his stinking chemicals were not quite as deadly as atom bombs.

Less than a year later, although he still hadn't made any money, he was so busy he needed help. Dave Halpern, a buddy from school, became a partner, and that summer they moved to quarters in the old Van Shaack Chemical Works, downstairs from a job printer and next door to a metal stamping company.

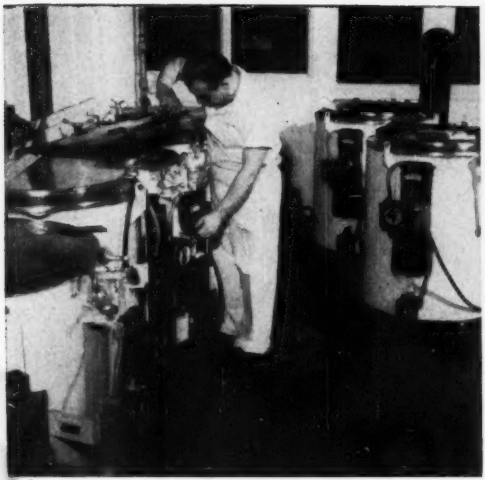
Liter flasks soon gave way to five-gallon and larger size reactors, and recently they retooled a war-surplus, stainless-steel airplane oxygen tank into a suitable reaction chamber. Stock shelves hold an orderly array of "monopoly" monomers, and releases on all new products go out regularly to an active list of 2,500 clients.

M-P is bulging its present 1,200 sq. ft. quarters. Zomlefer confides, with a twinkle in his eye, "there are two reasons for storing our raw material carboys in that shed outside—lack of space and my old friend, the fire inspector."

They have also diversified to provide a broader operational basis. Hybridizing their first names, Dave and Jack, into "Dajac," they organized a division devoted to the manufacture of biochemicals. The idea came when Harvard University Medical School asked them to prepare a biochemical for use in cancer research. Since then, 25 new biochemicals have been added to the stock list, and offerings of new ones go out regularly through the mailing list. Police department laboratories are presently being offered a reagent for certain medico-legal determinations.

Zomlefer speculates on M-P's and Dajac's future: "We expect to expand—you can't stand still. We will continue to develop and market chemicals that are not available commercially.

"There is no danger of overcrowding the field; for with hundreds of thousands of organic chemicals which can be made and used, a hundred companies can operate side by side with never a product duplication."



1 COOKING TANKS in which the coating mixture of gelatin, glycerine and water is melted, heat-treated and de-aerated.

2 FLUFFED UP MIXTURE as it looks prior to melting. Coloring can be added to the original mixture or put in later.

SPECIALTIES . . . . . .

Capsules by the Million

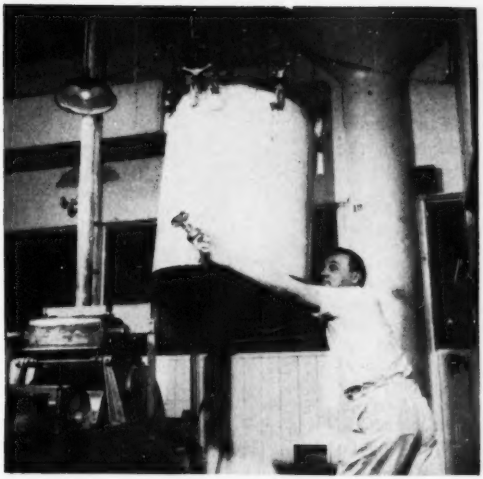
Winter is the heavy vitamin season. This is very evident at the Cleveland plant of Strong-Cobb & Co., pharmaceutical manufacturer, where vitamins currently bulk large in its daily production of several million capsules. About 50% of these products are shipped in bulk form; the other 50% are packaged under the customer's label right in the Strong-Cobb plant.

Formulas for the vitamins—or any other drug that may be put up in capsule form—are mixed by Strong-Cobb according to order. The company also mixes the glycerine, water, food grade gelatin and certified food colors that form the gelatin covering. Colors, a kind of aesthetic sugar coating, make the capsules appear more pleasing, and hence they are easier to take.

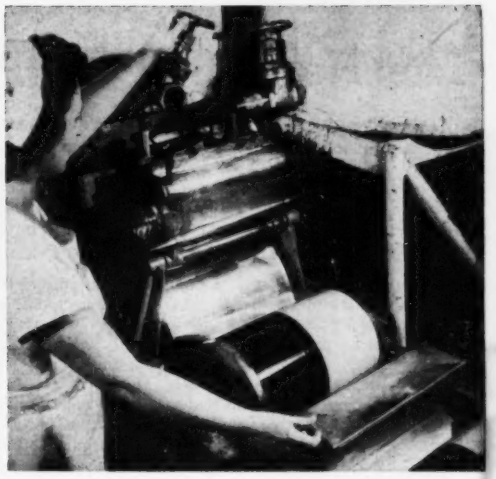
The "fluffed up" gelatin mixture is dumped into the "cooking" tanks where it is brought to the temperature (140 F) at which it not only is "cooked" for 48 hours, but is also de-aerated. Then the tanks are hoisted to a position

5 SHEET OF GELATIN is placed on capsule mold plate, will be pulled in evenly by suction. Only one-half covers mold.

6 CAPSULES are brushed into take-off hopper. Mold has been filled, gelatin ribbon flapped over, and capsules formed.



3 **FOLLOWING "COOKING," the tanks of gelatin are hoisted to the ribbon machine hopper to begin processing.**



4 **GELATIN from the hopper pours onto the first stainless steel roller which forms it into ribbon seen on second roller.**

above the ribbon machine hopper, and a controlled amount of gelatin is released.

As the mixture flows from the hopper it is caught by a stainless steel roller in the gelatin ribbon machine. The roller is cooled so that the gelatin instantly hardens, but is still tacky. The ribbon, about 14" wide, and in a continuous strip, goes around the back of the roller and comes up from underneath over a battery of small electrically-controlled fans for drying purposes, over another roller and its fans, and finally over the last roller where a slicer cuts the ribbon into the desired lengths.

A mesh conveyer belt brings the pieces to within easy reach of the operator. She picks up the cut piece, and places one half of it on the capsule mold. This leaves one-half of the gelatin hanging free.

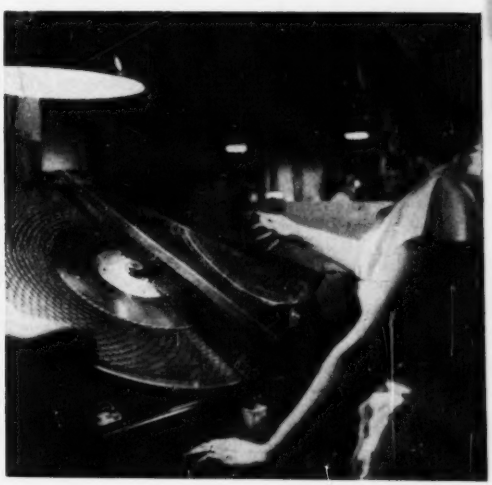
The malleable gelatin is pulled into the capsule holes of the mold plate by vacuum. Then the operator pushes the mold under a row of tiny spigots which release the vitamin mixture, filling each capsule with an exact amount.

When the entire plate is filled, the operator flaps the free gelatin over the mold, closes the plate, and pushes the mold into the press where the capsules are actually formed.

She then lifts the "web" of scrap gelatin from the mold, and brushes the capsules into a take-off tube which carries them into another room where they are released into the drying trays.

Drying is carried out in wire mesh-bottomed trays in an air-conditioned room. Each capsule is then inspected. From the inspection line they go to the counting machine. This can count as many as 2,500 capsules at a time into the foil-lined, hermetically-sealed kraft bags used for storing and shipping.

7 **TAKE-OFF TUBE releasing capsules into drying trays. Individual inspection of gelatin capsules will follow this step.**



8 **COUNTING MACHINE can handle as many as 2,500 capsules at a time, automatically checks them off into bags.**

The New "Sell" in Polishes

Leading furniture polish makers have switched to silicone-containing formulations, are gearing promotion campaigns to the public's acceptance of the new "miracle ingredients."

Other specialty manufacturers, remembering last year's meteoric rise of silicone car polishes, won't be left behind. More trade names will join Dri-Glo, Woodbrite, Pride.

Spring housecleaning—that unique American custom of beating the carpets, turning rooms upside down, polishing the furniture and woodwork—is just around the corner. But this year, upsetting though it may be to millions of householders, this hectic activity will mean plenty of smiles for at least three big chemical companies. General Electric, Dow Corning and Linde Air Products.

The reason: These manufacturers of silicones are gleefully anticipating a surge of business from furniture polish makers who have latched onto "silicones" as prime ingredients for their top-selling lines.

The public is intrigued: Every year or two, a chemical term is picked up by the public, endowed with magical properties, transformed by impassioned ad writers into a super-sales-getting gimmick. Not long ago DDT occupied that enviable niche; any insecticide carrying the "contains DDT" label was a hot seller.

Now it's "silicones." This week, for instance, Boyle-Midway, Inc. was getting set to introduce its new Woodbrite furniture polish—"Contains silicones—not a wax—not an oil . . . the greatest time and energy saver since the discovery of the vacuum cleaner."

That puts the "big three" of the furniture polish business squarely on the silicone bandwagon. O-Cedar Corp. is already trumpeting the virtues of its silicone-based product Dri-Glo *(CIW, Feb. 10, 1951, p. 25)* throughout the nation. S. C. Johnson & Son is pushing Pride *(CIW Newsletter, Jan. 27, 1951)* which it coyly does not say is a silicone-product, but doesn't deny either. (The company says that both Pride and Car-Plate, its fabulously successful product* of last year, are based on the same "scientific discovery—a new way of blending the waxes used." One trade-held belief: Johnson has been Mr. Wax for some 18 years, prefers to continue to cash in on its "wax" reputation by placing main emphasis on the wax-like worth of the products.)

With these large national specialties makers putting their chips on silicone furniture polishes, the smaller producers will undoubtedly follow suit. This was the pattern followed last spring when silicone car polishes broke in a big way. Johnson's Car-Plate and Boyle-Midway's Autobrite were the initial national sensations, but similar products popped up on stores shelves under a variety of labels.

Not all the small fellows were followers, however, for some of them had been marketing auto polishes—principally as a polishing service in gas stations—in different sections of the country. It's the same way with furniture polishes. One of the quality products already on the market is Tone, made by Tone Manufacturing Co., Grand Rapids, Mich. This has been used by furniture manufacturers in that area for several years, has been distributed in a limited area as a household item.

It's not all slogans: Although the public's current fascination with silicones may make promotion of the new polishes easier, the copywriters really have something to shout about. Because of their low surface tension, silicones spread over surfaces easily, giving good coverage and helping to remove dirt. They keep materials from sticking to table tops, etc., since they have excellent release characteristics. Silicones are inert, resist both heat and cold, and consequently give long-lasting protection. When used with carnauba wax, silicones lubricate it without softening it; they make it easier to spread, and they bleed to the surface to give added protection. Formulated polishes don't collect dust, give a rich, hard finish to furniture.

The product may or may not contain wax. Some disclaim any wax, are composed of a few per cent of a silicone in a solvent. Others contain not only wax and silicones, but also have an emulsifier to assist in removing some stains. Most of them are also recommended for polishing household articles made out of chrome, porcelain, leather, etc., as well as wood.

Pride is packaged in a 10½-oz. bottle which Johnson claims will do six

FURNITURE POLISH: Both public and manufacturers are "going silicone."

rooms of furniture. It sells for a dollar. Dri-Glo, a 10-oz. bottle, retails for 98 cents; and Woodbrite, an 8-oz. bottle, sells for 79 cents.

* An estimated 13 million cans were sold last year at a dollar a can.

G-11 Shampoo

Ever since hexachlorophene became available to specialty makers as a germicidal agent for use in soaps and kindred products, scores of soapers have been eyeing its potential use in shampoos. This week, Armour & Co., which was the first to sell a hexachlorophene-based bar soap on a national basis, began to test-market a companion product, Dial Shampoo, in New Orleans. Significance: a new use for the germicidal agent,* another competitor for established shampoos.

Consumer demand is actually what lured Armour into the shampoo field. Soon after Dial bar soap hit the market a couple of years ago, the company began to receive reports from customers who lauded the then-new product as a dandruff curber. However, they said, the bar soap was far from convenient to use, would Armour develop an easy-to-use shampoo?

Laboratory compounding tests, which extended over an 18-month period, led to pilot-plant production in Chicago of a quantity of shampoo sufficient for test-marketing. At Christmas the new shampoo was included in gift boxes and sold nationally to commercial firms. Response was favorable, spurred planning for a test-

* Hexachlorophene is a generic term for 2,2'-dihydroxy-3,5,6,3',5',6'-hexachlorodiphenymethane. It is sold under the tradename G-11 by Sindar Corp., used under patent license agreements in shaving creams, cake soaps, industrial soaps, baby and veterinary products.

SPECIALTIES

marketing study.

The first 3½-oz. plastic bottles (67¢) popped up in New Orleans during the second week in February, and an extensive promotion campaign was launched the following week. Whether Armour will "go national" with the shampoo depends on the results of the New Orleans project. If sales are favorable, and barring material shortages, nationwide distribution might be expected within the year.

•

Insecticide purchases: Military requirements are putting a heavy drain on insecticides. The Navy recently bought almost 2 million gallons of bulk insecticide for $1.7 million in one day. On the same day it bought 4 million cans of one type of insecticide and a half million pounds of insecticide powder for $770,000.

•

No-drip nozzle: Upressit Products Corp.'s (New York City) new no-drip nozzle is being used on pint cans of Hercules Turpentine. The length of the nozzle and its lip construction do the trick.

•

Mint for soap: Fuld Bros. (Baltimore) is putting up liquid hand soap with a mint fragrance. It has a creaming action, is called Mint Foam.

•

A cream deodorant shampoo, Viv, is being test-sold by Toni Co. (subsidiary of Gillette Safety Razor Co.) in Omaha and Lincoln, Neb. Made in pilot-plant quantities in St. Paul, Minn., it is packaged in bottles, 4 oz. at 59¢ and 8 oz. at $1.00.

No plans for national distribution have been decided upon as yet.

•

Protective ceramic: New protective ceramic coating stands up to oxidation and corrosion at 2400 F. It is called Elkote and will adhere to metals of widely differing coefficients of expansion, even when subjected to vibration, flexing, and sudden thermal shock. Elraco Engineering Co., Hoboken, N.J. will back up its claims for the product by coating and returning metal samples submitted by interested parties.

•

Adhesive drapes: Transparent, plastic surgical drapes with adhesive margins, eliminate the need for clips around field of a surgical operation. Drapes, packaged in four sizes, are moisture-proof, non-irritating, and stick tightly to the skin. Developed by the Minnesota Mining and Manufacturing Co. in association with several Cleveland surgeons, the new product will bear the Scotch brand label.

•

Detergent and bleach plant: Purex Corp., Ltd. has started construction of a $1 million plant in St. Louis, Mo. to make synthetic detergents and household and industrial bleaches.

•

Industrial Wax W-6119 is a new, non-toxic corrosion inhibitor, designed to meet Defense Dep't. Specification Mil-C-10382 on the manufacture of food handling equipment. A product of S. C. Johnson & Son, Inc., Racine, Wis., the material may be applied by dip, spray, or brush to all metals. Removal is accomplished by a standard vapor degreasing operation. Purchase orders should have a DO number.

•

Catalog standardization: Representatives of industry and government agencies are getting their heads together on the problem of standardizing catalogs for drugs and related products. Items under consideration are descriptive symbols, abbreviations, listings, headings, packaging, and designation of quantities and sizes. Suppliers of drugs are invited to send their recommendations to Commodity Standards Div., Office of Industry and Commerce, U.S. Dep't. of Commerce, Washington 25, D. C.

•

Thixon is the new trade name for Dayton Chemical Products Laboratories, Inc.'s line of rubber-to-metal bonding agents. The new name followed by subscripts will identify products previously designated by manufacturer's formula numbers. Distribution in the East and Mid-West will be handled by the Harwick Standard Chemical Co. of Akron, Ohio.

•

Terramycin in new form: The antibiotic terramycin is now being produced as a concentrated oral drop. Flavored cherry-mint, the new drops are expected to find greatest use in pediatric practice.

•

Scabrin structure: The chemical structure of scabrin has been shown by the USDA Bureau of Entomology and Plant Quarantine to be the N-isobutylamide of either 2,4,8,10,14-, 2,4,8,12,14-, 2,6,8,10,14- or 2,6,10,-12,14-octadecapentaenoic acid or a mixture of these isomers. Scabrin is the proposed name for a new insecticide discovered by the UDSA in the roots of various species of Heliopsis plants native to this country (*CI, July 1950, p. 70*).

We're versatile at Wyandotte

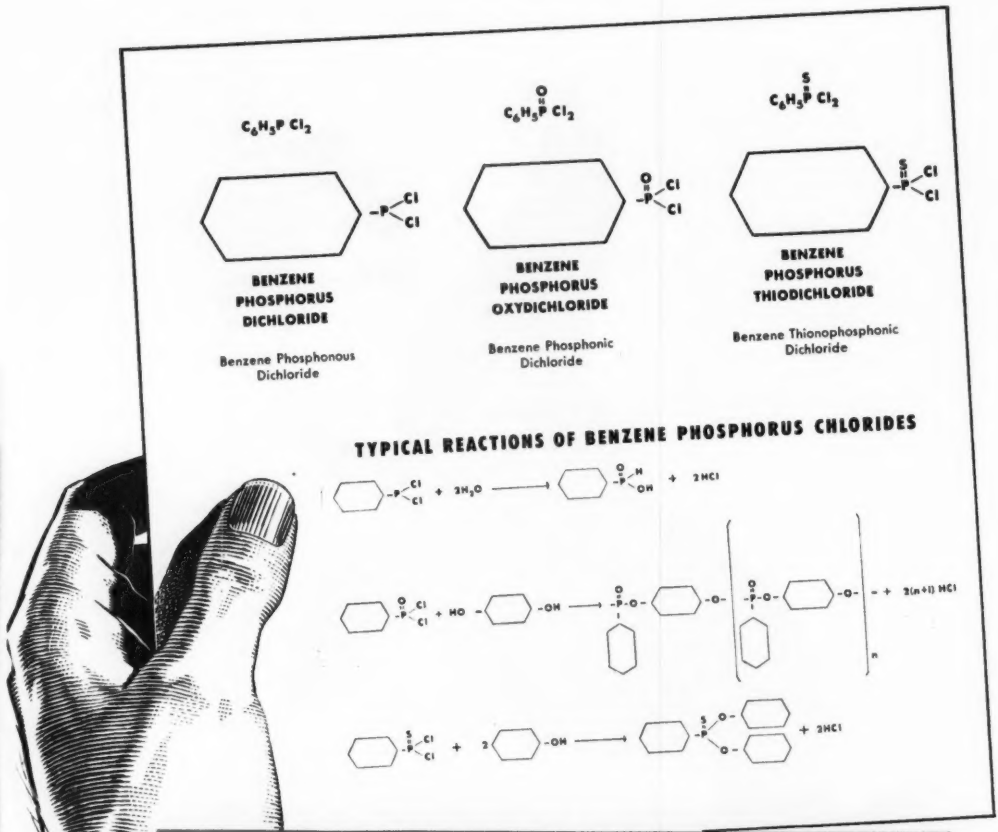
Some caustic producers make their NaOH by the lime-soda process. Some by one or both electrolytic processes. Wyandotte makes caustic by *all three* methods. So that caustic soda production at Wyandotte is not limited by the manufacture of chlorine. And that's an advantage these days.

Of course, our versatility doesn't end there. We make Wyandotte Caustic Soda in many forms: 50% liquid, 74% liquid, solid, standard flake, ¼ inch flake, crystal and powdered. And we've got a Technical Service Department that will be glad to help you find which of these forms suits your needs best.

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • *Offices in Principal Cities*

Wyandotte
REG. U. S. PAT. OFF.



How You Benefit from Victor Research

It pays to keep an eye on Victor research. Alert watchers, for example, have already found excellent uses for these phosphorus chlorides that were commercially developed in Victor's research laboratories.

What properties do you seek in a phosphate, formate or oxalate? What's your specific problem that specially developed derivatives of these important chemicals may solve? Ask Victor. We may already have the answer . . . or may be able to get it for you.

This is a part of Victor's accent on service to industry. There's no obligation, of course.

Additional information on Victor organic phosphorus chlorides and their derivatives, as well as experimental samples are available. Check and clip the coupon to your letterhead or write if you prefer.

ATTACH THIS COUPON TO YOUR LETTERHEAD

Please Check
INFORMATION SAMPLES

- ☐ ☐ Benzene Phosphorus Dichloride
- ☐ ☐ Benzene Phosphorus Oxydichloride
- ☐ ☐ Benzene Phosphorus Thiodichloride

Name_____ Position_____

Company_____

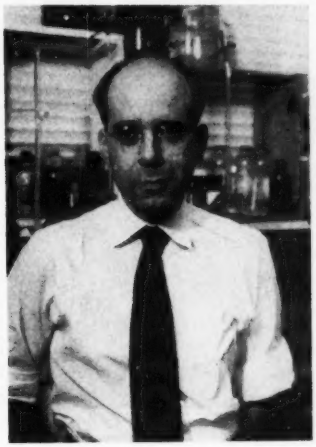
Address_____

City_____ Zone____ State_____

VICTOR CHEMICAL WORKS
141 W. Jackson Blvd., Chicago 4, Ill.

A. R. MAAS CHEMICAL CO., Division
4570 Ardine Street, South Gate, California

Ad No. V8-51—Advertisement Created by: Cruttenden & Eger—Chicago



GREENSPAN AND MacKELLAR: Eyeing the food processing market.

New Job for Peracetic

Peroxygen research at Buffalo Electro-Chemical Co. has shown peracetic acid to be a potent bactericide-fungicide.

Food processing is the chief indicated use, although applications in this capacity are still in an exploratory stage.

Newest discovery of Buffalo Electro-Chemical's peroxide chemistry is the germ-killing powers of peracetic acid. Thanks to researchers Frank P. Greenspan and Donald G. MacKellar, this familiar textile chemical may soon be seeing widespread service in food packing and processing plants.

Peracetic acid combines the active oxygen of hydrogen peroxide in the acetic acid skeleton, but strangely enough, its bactericidal activity exceeds that of either progenitor. The acid attacks a wide range of microorganisms, and is especially effective against the tough spore formers.

Its fatal charm works equally well on bacteria and molds, making peracetic a good weapon to combat the most common causes of food spoilage. Another point in the acid's favor is that it leaves no harmful residues on produce.* Upon application it breaks down gradually to acetic acid and hydrogen peroxide; peroxide in turn goes to water and active, germicidal oxygen. Final decomposition products are water and acetic acid, a decidedly non-toxic combination. Peracetic acid itself is not adsorbed on fruit surfaces, and is thus non-cumulative.

Becco's product comes in colorless, pungent, 40% water solution. Germicidal solutions however, are considerably more dilute, containing between 0.001% and 0.3% acid (depending upon specific use). Safety precautions for the concentrated acid are similar to those for glacial acetic, but dilute germicidal solutions may be handled without any special care. They are applied by dip or spray in predetermined concentration and pH. (Adjustment of acidity is easily accomplished with sodium hydroxide.) Even neutral solutions, essentially solutions of sodium peracetate, retain their death-dealing efficacy.

In practice, the germicidal formulation is applied by dip or spray. Peracetic acid is compatible with cationic, anionic, and non-ionic detergents and surface-active agents—important in fruit spraying, for wetting agents facilitate coverage and allow effective treatment of produce in containers. Furthermore, combination of a germicide and detergent makes for extra-efficient sanitizing of equipment.

Forty per cent peracetic, in its original container, will keep for months in a cool place. Stability increases with decreasing temperature, but even at 30 C, a 40% solution will analyze 39.6% after a month. Dilute solutions decompose gradually by hydrolysis; purity of water, type of storage vessel, temperature, and pH influence breakdown rate. Monel, stainless steel, inconel, and wood are good container materials, but mild steel, coated with polyethylene, Teflon, Kel-F, or a vinyl resin, may be used.

Good for tomatoes: Work of Greenspan and MacKellar has proved peracetic especially effective in preventing mold spoilage of tomatoes—although this is far from the whole story. Grapes, berries, cucumbers, bananas, and citrus fruits benefit from the acid treatment. Despite the value of peracetic acid in reducing contamination and spoilage of food during storage and transportation, it is of particular interest in sanitizing fruits and vegetables where further processing does not includes pasteurization. Chief case in point is the frozen food industry, a prepossessing potential market.

Other important applications will be in general equipment sanitizing, and as an acid cleaner-sanitizer for the dairy industry. A further possibility is the control of enzymatic industrial processes; dilute peracetic acid denatures oxidase and peroxidase enzymes. Processes dependent upon such enzymes could easily be halted at a desired stage without recourse to heat. This, and other areas of research are still too young for anything more than cautious speculation.

* Peracetic acid is well tolerated by the body in amounts present on produce after germicidal treatment. Rats were found to suffer no ill effects after ingesting the acid at concentrations 25 times greater than the maximum possible on unwashed tomatoes. Toxicity data has been filed with the FDA.

Atom Course

Radioisotopes in industry is the subject of a five-day conference to be held April 2-6 on the campus of Case Institute of Technology, Cleveland. AEC is cooperating in presenting the conference.

Purpose of the session, for which a $50 fee is to be charged, is to acquaint industry men with use of radioactive materials in production and research. Topics include atomic energy fundamentals; hazards; safe handling techniques; laboratory construction; control and operation; practical present-day applications in industry, medicine and research.

Copies of the complete program and registration forms are obtainable from John R. Bradford, Radioisotopes Laboratory, Case Institute of Technology, Cleveland 6, Ohio.

Lignin-Rubber

Finding practical uses for lignin is a problem of paramount importance to pulp and paper producers. One possible answer, uncovered by research at West Virginia Pulp & Paper Co., is incorporation (by coprecipitation) into various rubbers, where it often gives better strength than carbon black or inorganic reinforcing agents.

A loading of 50 lbs. of lignin with 100 lbs. of nitrile rubber (GR-A) gave a vulcanizate whose tensile strength was 150 psi higher than one loaded with an equal volume (38.5 lbs.) of easy processing channel black. At double this volume loading, equivalent to 100 lbs. of lignin, tensile strength exceeds that obtained with EPC black by 800 psi. Other carbon blacks and the inorganic pigments give lower values than does EPC black.

Similar loadings with natural rubber give higher tensile strengths than any other pigments, including the carbon blacks, at the same volume loadings. In natural, as well as GR-S and nitrile rubbers, lignin gives low modulus, high elongation and good tear resistance.

In neoprene, however, lignin reinforcement yields lower tensile strengths than carbon blacks, low tear resistance and low elongation.

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Synthetic analogs of adrenal cortical hormones, which show physiological activity similar to natural materials, are the outcome of recent University of London research.

Of the several investigated, four—which may have effects comparable with hard-to-get and hard-to-synthesize natural hormones—have significant activity despite their simpler molecular structure: indan-1-hydroxymethyl ketone and its fully saturated hexahydro derivative; 5-phenylindan-1-hydroxymethyl ketone; and *p*-acetoxy-*p'*-(ω-hydroxy) acetonyldiphenyl.

Hydrazide Foam

Research at Naugatuck Chemical Division (U. S. Rubber Co.) has shown organic sulfonyl hydrazides to be effective, nondiscoloring, nonstaining and odorless foaming agents for rubber and plastics. Best of the lot appears to be p,p'-oxy-bis (benzenesulfonyl hydrazide).

The compound decomposes under heat, evolving nitrogen and water and leaving a polymeric residue presumably consisting of benzene rings joined by ether, thioether and sulfone linkages. Since the residue is highly polymeric, it is odorless; it is also neutral and has little or no effect on the stability or cure rate of the polymers into which it is introduced. The latter factor is important, for a careful balance between rate of cure and rate of blow must be maintained in order to get satisfactory plastic sponge.

FOAMED PLASTIC: No smell with hydrazide.

Stable under storage and nontoxic, the compound produces a fine, even cell structure—either open or closed, depending on the processing technique—in natural, reclaimed and synthetic rubbers; polyvinyl chloride, polystyrene, polyethylene, and other polymers.

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Partially methylenated cottons have been prepared by the reaction of cotton with formaldehyde at USDA's Southern Regional Research Laboratory, New Orleans. The reaction takes place under acid conditions in nonaqueous (mainly acetone) media to give a product that is indistinguishable from ordinary cotton in appearance and general textile characteristics.

But the modified cotton displays new properties even at relatively low formaldehyde content—0.5% to 1.5%. Dye-resisting yarns can be produced, wherein the resistance appears to be due to cross-linking of the cellulose. The treated cotton also swells less in water and other agents which swell or dissolve cotton. If sufficient formaldehyde is incorporated, the fibers have excellent resistance to biological rotting.

Gas From Underground Fire

Bureau of Mines' underground gasification tests at Gorgas, Ala., point to practical utilization of thin coal seams. A large-scale test, involving the drilling of a quarter-mile tunnel, has just been completed successfully.

A gas with a heating value of 120 BTU per thousand cubic feet was produced for days on end.

Next phase of the testing will be an attempt to gasify coal without tunneling to the face of the coal seam.

The second trial run of the U.S. Bureau of Mines' Underground Gasification Project at Gorgas, Ala., has been successfully completed under the direction of James L. Elder. This second test follows an earlier, smaller-scale test by several years. A third and still more extensive test is scheduled to get under way within the next month.

The project is a joint venture of the Bureau of Mines and Alabama Power Co., owner of the coal land. The experiment which was just completed was started in March, 1949.

The gas initially produced had an appreciable content of methane and a heating value of 300 BTU per thousand cubic feet. A later, methane-free gas gave 180 BTU, which figure was once maintained for as long as eight hours. Bypassing the burning coal seam by air and oxygen reduced the quality to 120 BTU after the eight-hour period.

Two turbines were operated continuously on the product gas, one for a period of 30 hours and one for several days before the holes were recapped.

A 1,600 foot tunnel was dug in the seam by ordinary mining methods. Air or oxygen was pumped through it as well as through the additional tunnel which paralleled the original one for the first 1,300 feet. (The lower 300 feet was pierced by a single tunnel only.)

These shafts were crosscut with boreholes every 300 feet to permit testing in each section. Air was pumped to the face of the seam through one hole and the product gas taken out through the other. Twenty-inch pipes in the tunnels were used to carry both gas and air. Also, several six-inch holes were drilled from the surface to the coal seam to carry thermocouples. These indicated that a temperature of 2000 F was reached.

To fire the mine, lumber was first piled up and several tons of coal dumped on it. This was saturated with oil and ultimately ignited by a thermite bomb dropped into one of the boreholes after the ends had been sealed.

The reported test data were not gathered until after the fire had been allowed to burn for several months. At first a small amount of oil was produced and then the gas was mixed with a small amount of methane. It eventually settled down to a heating value of 120 BTU per thousand cubic feet. There was also a great deal of sensible heat which would be recovered from the gas in actual commercial operation.

On one occasion, when the air and oxygen bypassed the coal seam and reached the hot gas, flames shot a hundred feet in the air and melted the rock, the top of the pipe, and the refractory cement used to seal the pipe in the borehole. When air flow was reduced, the molten material flowed back into the hole and resealed it.

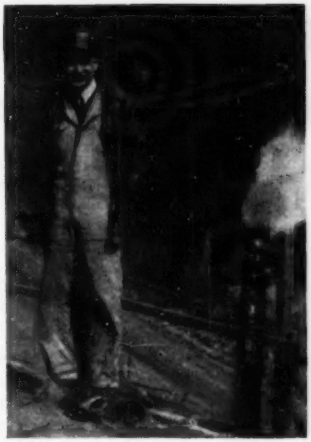
In this test the roof did not drop in after the burning coal as it did in the first test.

The problem now, according to Elder, is to develop a method of preventing the air from bypassing the burning coal rib. Such bypassing dilutes the product gas and reduces its heating value.

Next step in this large-scale experimental program will be to fire the coal seam without costly tunneling. Holes are now being drilled into the coal seam for insertion of electrical heaters to coke the coal and for admission of air needed for gasification. After a small quantity of coal has been coked, the seam will be fired.

Another type of test will subsequently be made. Oil mixed with napalm will be forced under extremely high pressure between the coal seam and the roof to lift the latter and permit free passage of air.

To date the experiments have cost about $750,000; some 10,000 tons of coal have been burned. So far the tests have proved that coal in thin seams (3′ to 6′ in thickness) can produce a valuable fuel gas. Coal in such thin seams is worth only about 10¢ per ton underground because of the great cost of mining.



JAMES L. ELDER: Combustible gas from unmined coal.

Pump Power

Electric strain type torquemeters plus accurate speed measuring equipment, have increased the accuracy of determining horsepower input of centrifugal pumps over the calibrated motor method for Allis-Chalmers Manufacturing Co. The new equipment, installed in its pump testing laboratory, is expected to reduce time and labor of testing pumps by 60%.

The new procedure is based on use of SR-4 bonded resistance wire strain gages, manufactured by Baldwin-Lima-Hamilton Corp., to measure torque. When bonded to a reduced section of a special alloy steel shaft at 45° with the longitudinal axis, the strain gages measure the maximum torsional strains.

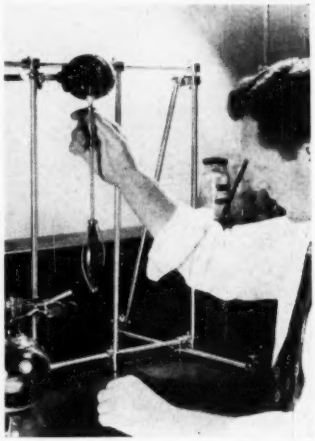
The gages are connected in a Wheatstone bridge circuit to cancel bending and thrust stresses and make torsional stresses cumulative. Thus torsion causes a proportional bridge unbalance as the gage resistance varies with the strain.

Slip rings connect the four corners of the bridge to the measuring instrument. Torque, drive shaft speed and pump discharge and inlet pressure are

PRODUCTION. . . .

automatically recorded to complete the test setup.

Umbrella Stirrer



THE NEW umbrella stirrer of Fisher Scientific Co. has four four-inch blades arranged for easy insertion through narrow-necked flasks. The new stirrer, patented by Dr. Morris Graff, has a 12″ shaft which fits into any motor chuck accommodating ¼″ rods. The stainless steel stirrer blades can be twisted while inside the flask to provide a variety of shearing actions.

Thermometer

By resistance: The new averaging resistance thermometer of Weston Electrical Instrument Co., a co-development of Weston and Standard Oil Development Co., provides an accurate means of determining the temperatures of stored fluids.

This is accomplished with a series of resistance thermometers in a vertical tube. A level selector is so arranged that when set at the level of the liquid the thermometers below that level are placed in a circuit. This circuit is so arranged that the temperature indicated on the dial is an average of the readings of each thermometer in the circuit. Thus, when emptying a tank, it is easy to apply the necessary temperature correction factors without the necessity of averaging out temperatures read from a number of different locations.

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Eccentric piston pump: A new small M-3 pump, less than four inches long, is being produced by Eco Eng'r. Co. It delivers 1.65 gpm at 150 psi despite its small size.

ALUMINA POWDER: Raw material will be Jamaican bauxite.

Kaiser Ups Aluminum Stake

Huge expansion program ($79 million) will increase Kaiser aluminum production 200 million lbs. a year.

Plans include development of Jamaican bauxite as well as construction of reduction plant and power facilities.

Money for program will come out of large fund raised from 18 insurance companies ($75 million) and 8 banks ($40 million).

Henry Kaiser has officially confirmed the report (CIW Newsletter, Feb. 17) that his company will build an aluminum reduction plant in the Gulf Coast area. The plant will be part of the company's integrated $79 million expansion program to increase aluminum production to meet military and essential civilian needs.

A 280 acre site in St. Bernard Parish, on the outskirts of New Orleans has been purchased. The site will house the reduction plant with 4 potlines, and a power plant. It is located on the Mississippi at a point that is navigable by ocean-going vessels. Plans call for the construction of docks and handling facilities on the river front.

Plant construction will get underway immediately, will be pushed in an effort to be in operation by the end of this year. Full-scale production, however, won't be hit until the middle of 1952.

The new plant will have an annual production of 200 million lbs. This will boost Kaiser overall production of primary aluminum to 540 million lbs.—an 80% increase since the outbreak in Korea.

Raw materials: Bauxite will be supplied from the Kaiser mines in Jamaica. The holdings there will be opened and developed. The Jamaican bauxite will supply enough raw material to serve the 2 reduction plants in Washington as well as the new one.

The Baton Rouge plant for processing alumina will be expanded and modified to receive the Jamaican ore. From there it will be shipped by rail or barge to the New Orleans plant.

Power: Kaiser will build its own power plant on the New Orleans site to furnish the necessary volume of low cost electricity. The power plant will utilize the natural gas from the vast reserves of the Gulf Coast fields. A contract has been signed with the United Gas Pipeline Co. for supplying gas up to 70 million cu. ft. daily.

Finance: The entire expansion program will be privately financed. Eighteen insurance companies have agreed to purchase $75 million of first mortgage 25 years bonds. The bonds will bear 3⅝% interest, will be due in 1976.

Eight banks will lend the company $40 million at 3⅛% interest, fully payable in semi-annual installments by Nov. 30, 1955.

Last week, Kaiser Aluminum and Chemical became 100% privately financed when it paid off its government mortgages of $37,394,250. Payments on the mortgages of the 5 plants (purchased from the government) were not due until 1974.

Pollution Report

Four task groups of the National Technical Task Committee on Industrial Wastes which met last month with government officials in Cincinnati reported this week that definite progress is being made toward more effective control of wastes which contribute to the pollution of the nation's waterways.

The committee was organized at a meeting in Washington, D.C. last May on the invitation of Dr. Leonard A. Scheele, surgeon general of the U.S. Public Health Service. The PHS administers the Federal Water Pollution Control Law.

The committee, at that time including representatives from 22 industries, drew up a broad outline of an industry-federal government approach to the pollution problem. The initial tasks agreed upon included (1) assembly of a list of sources of information on processes and practices, known for using, treating and controlling industrial wastes, (2) assembly of a list of research projects concerned with treatment and disposal of industrial wastes, and (3) compiling a list of problems that confront a given industrial group and for which there is no satisfactory solution.

The four industrial task groups making reports to the committee represented the food industries, mineral products, chemical processing and general industries. The two-day meeting was presided over by chairman Lyman Cox of Du Pont.

Dr. Harry Gehm, technical director of the National Council On Stream Improvement for the pulp, paper and paperboard industries, New York, reported for the task group covering the chemical processing industries.

In this group are included such

industries as the chemical, pulp and paper, textile, rubber, tanning, electroplating, paint and varnish industries, which Dr. Gehm described as having made progress in making available research and process information dealing with the control and treatment of plant effluents. His group recommended that the government make fundamental studies on problems common to the industries of this group, such as the thickening and dewatering of hydrous residues obtained in treatment of some wastes.

L. C. Burroughs, of the Shell Oil Company, made a report for the task group covering the coal, coke, iron, steel and petroleum industries. All these industries are actively working on waste disposal problems and are making good progress, he told the committee. Burroughs reported that in practically every anthracite mine operation where cleaning plants have been installed, large sedimentation and clarification equipment has been put in use.

"One of the most difficult problems of the by-products coke industry is the disposal of waters containing phenols, cyanides and oily wastes," Burroughs said. To handle phenols, he explained, a large new type de-phenolizer has recently been placed in operation and several older units have been modified to increase their efficiency.

Cyanide recovery: Burroughs told the committee that an industrial size process demonstration plant has been built for the recovery of cyanides at one by-product coke plant. He also said that while expensive neutralization process is being used to handle steel mill pickle liquor disposal, no universally applicable method has been evolved.

The Shell official also reported on the cooperative waste disposal work in the oil industry which is concentrated largely in the American Petroleum Institute's committee on disposal of refinery wastes. He revealed that the API committee has under way a heavier program of work than at any time in its 22 years of existence. Burroughs added that the Institute hopes to publish later this year, new and greatly expanded editions of the manuals on (1) sampling and analytical testings of waste waters and (2) methods and devices for disposal of chemical wastes.

He reported that a research project, sponsored by API at the University of Wisconsin, has developed improvements in the API oil-water separator design which will be described in one of four papers to be presented before an oil industry meeting in Tulsa in May, and that an API biological research project is nearly completed at the Academy of Natural Sciences of Philadelphia.

The task committee revealed that it will not push for appropriations to provide loans or grants to municipalities for public treatment works, but will confine itself solely to recommendations on the needs for basic research in the broad public interest. At present the committee is being expanded to include representation from other industries.

Sulfur Lament

The refusal of defense mobilizer Charles E. Wilson to withhold an allocation order on sulfur until full hearings could be held by the subcommittee on fertilizer and farm machinery of the house committee on agriculture has caused the subcommittee to cut short its planned excursion into sulfur and fertilizer shortages (CIW, March 3).

After four days of rushed hearings the subcommittee (headed by Rep. Thomas G. Abernethy) issued a report with recommendations. Report is believed to be tentative and was issued to make sure that agriculture's position and interest in the sulfur shortage is presented.

In addition to U.S. Department of Agriculture spokesmen, the congressional committee heard Joseph S. Bates, chief of NPA's chemical division, and other government officials and industry representatives. Bates admitted that his office had no policy directive to guide it in its allocation decisions, and had not yet completed its classification of sulfur and sulfuric acid users.

The committee also heard H. D. Reynolds, representing the Army's Chief of Ordnance. He said the army would require 95,000 tons of ammonia in the April 1951–May 1952 period.

JOE BATES: With allocation imminent, no policy directive.

Reynolds revealed there is no government plan to have industry operate any army-controlled units. No definite decision has been made to reopen the Morgantown, West Va., nitrogen plant, he said. The plant, largest World War II producer of ammonia, is currently on a stand-by status. And the defense department recently allocated $8.6-million to initiate a modernization program. Capacity is estimated at 18,000 tons nitrogen per month.

Representatives of Freeport Sulfur Co., Duval Sulfur & Potach Co., and Texas Gulf Sulfur Co., pointed out that sulfur producers are spending large sums in efforts to find new sources. But so far these have been without notable success.

A spokesman for the Commerce Department's Office of International Trade said that within two years definite reductions in exports are possible. The 1951 exports have been cut about a third below 1950 through an export quota. Some foreign countries are beginning to use pyrites.

Committee report: At the conclusion of the four days of hearings, the committee rushed out a mimeographed report. Their conclusions about the sulfur supply are: (1) demand (including export) will exceed supply in 1951 by more than 500,000 tons; (2) there is little immediate prospect of increasing the supply; (3) the problem in 1951 is to distribute available supply where it will do the most good.

After discussing agriculture's position in the sulfur shortage (farm production will require more fertilizer), the committee charged that the government has no distribution policies on sulfur. The committee said the present system of establishing priorities for scarce materials by DO ratings and orders completely disregards the requirements of agriculture.

The committee charged that the NPA chemical devision chief (Bates) has no policy directive to guide him in deciding between agricultural and other claimants, or determine how, or with what priority, scarce materials are to be distributed. "Nor does he have within his division any consultant qualified or even purporting to present the requirements of agriculture," the report reads.

The department of agriculture has

not been consulted in the drafting of a sulfur allocation order, the committee charged, and has been unable to get a copy of the proposed order. The committee said such a control order is known to exist and is "making the rounds" of the defense production agencies.

The committee stated that there has been no real effort on the part of ECA to get European industry to use Spanish pyrites, rather than American sulfur, as its source of sulfuric acid. "In the event of a war, European industry would probably have to depend almost entirely on European sources of sulfur, since it would probably be impossible to ship American sulfur across the ocean. It would appear to be the course of prudence, therefore, to make the shift to these sources now," the committee recommended.

The committee also reported that since there appears to be little prospect for increasing sulfur production in 1951, industrial process sulfuric acid, now wasted, should be reclaimed.

Considerably more effective use of phosphate fertilizers might be obtained by reshuffling mixed fertilizer formulas to reduce the phosphate application to those crops which can get along temporarily on smaller amounts of this plant food.

In planning for the future, the committee recommended that by-product sulfur be recovered where possible. But the committee's inquiry had failed to disclose any evidence that defense agencies are planning for or requiring by-product sulfur production as they approve and assist defense plant expansion.

Six points: The committee summed up its recommendations in a 6-point statement: (1) that defense mobilizers recognize agriculture is an essential defense industry and give it that status in any allocation of critical materials; (2) that agriculture department officials be appointed to policy-making agencies; (3) that exports be reviewed to see how much foreign countries can do without; (4) that present users of sulfur and sulfuric acid be surveyed to find if any is being wasted that can be re-used; (5) that long-range sources of sulfur and sulfuric acid be examined by the government, and that sulfur recovery be required, where appropriate, as a condition of the approval of any facility for accelerated amortization or any other such governmental assistance; and (6) that research be intensified to discover methods of producing fertilizer with less acid.

Monsanto: Annual report shows the company hit an all time record for sales and net income. Sales ($227,135,206) were up 37% over 1949, income ($26,220,333) 52%. The 6 months excess profits tax took a big bite—earnings were $5.37 a common share ($3.74 in 1949), would have been $6.58 if 1949 tax system had prevailed.

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U. S. Rubber: Company had a record year for production, sales, and net income. Sales ($695,756,000) were 34.5% over 1949 and 20% above previous high of 1947. Net income ($24,658,000) was 63% higher than 1949 and 6.2% over the record profit year of 1946. For stockholders, earnings were $11.04 a share—in 1949 they were $5.62. The 6 months excess profits tax reduced profits $7,800,000.

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Alkali exports: The board of directors of the U.S. Alkali Export Association decided to temporarily discontinue activities in the distribution of alkali and alkali products in foreign markets. Alkasso President E. V. Finch said the recent decision of the U.S. District Court (CIW, Feb. 17, p. 39) did not require the abandoning of present sales export program. However, the board felt, that to comply with the stated purpose of the decree, the association would have to terminate, for an appreciable period, all combined sales activities through association agents abroad.

Government Needs

The Navy Purchasing Office (111 East 16 Street, New York City): 80,000 lbs. of soda ash and 6,000 tons of calcium hypochlorite. Bids on invitation No. 8423, will be received until March 16.

Until March 23, the office will receive bids (Invitation No. 8453) on 10,500 units of skin protective compound.

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The Aviation Supply Office (700 Robbins Ave., Phila.): 66,000 gal. of acid proof paint, specification Jan.-P 450. Bids, on invitation No. B-52978, will be received until March 12.

Until March 19, the office will receive bids on 51,600 lbs of pigment, 3,700 pts. of reducer, 4,300 cans of shellac, 26,300 qts. and 500 gal. of thinner. Invitations are on No. B-53968.

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Chief, Purchase Division, General Services Administration, Region III, 7th and D Streets, S. W., Washington 25, D. C.: 340 qts. auto liquid polish, 3,600 qts. furniture polish, 2,040 qts. metal liquid polish, 60 lbs. metal paste polish. Bids, on Invitation No. 97943-R/3/, will be received until March 15.

Government Contract Awards

Western Associates: 12,254 cans of isopropyl alcohol—$48,403.30

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Jean Vivaudou Co: 10,000 cans of isopropyl alcohol—$37,500.00

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Rohm & Haas Co: 20,200 gallons DDT—$38,099.00

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C. G. Whitlock Chemical Co: 20,000 gallons of carbon tetrachloride—$27,840.00

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Fresno Agricultural Chemical Co: 6,270 gallons of chlordane insecticide—$58,084.00

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Pennsylvania Salt Mfg. Co.: 38,700 gallons of sodium arsenite—$35,991.00; 23,000 gallons of sodium hypochlorite solution—$41,570.00

Octagon Process, Inc.: 66,000 gallons of sodium hypochlorite solution—$25,028.00

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B. T. Babbitt, Inc.: 482,400 cans (13 oz. size) caustic soda—$56,947.00

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The Davison Chemical Corp.: 63,000 lbs of dessicant— $29,746.00

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U. S. Industrial Chemicals, Inc.: 150,000 lbs. of ether (grade A, specification J A N - E - 1 9 9 and amendment 2)—$28,500.00

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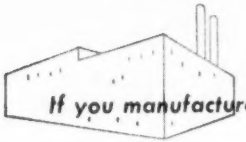
Kamen Soap Products Co., Inc.: 9,200,000 lbs of soap powder—$413,080.00

triethyl phosphate



If you manufacture:	*Investigate Eastman triethyl phosphate as a:*
Water Paints Water Glues Textile Sizes	**PLASTICIZER**
Hydraulic Fluids Transformer Oils Lubricating Oils	**VISCOSITY MODIFIER**
Paint, Varnish, or Lacquer Removers	**PENETRATING AGENT**
Tetraethyl Pyrophosphate or Similar Insecticides and Rodenticides	**REACTANT**
Ethylated Amines, Alcohols or Phenols	**ETHYLATING AGENT** (All 3 ethyl groups are available)
Diolefins	**DEHYDRATING CATALYST** for Glycols and Olefinic Alcohols

Eastman triethyl phosphate is also useful as a specialty solvent and as a deicing fluid. We will be pleased to send you detailed information and sample quantities of Eastman triethyl phosphate for your evaluation. Write to TENNESSEE EASTMAN COMPANY (Division of Eastman Kodak Company), KINGSPORT, TENNESSEE.

EASTMAN INDUSTRIAL CHEMICALS

SALES REPRESENTATIVES: New York—10 E. 40 St.; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave. **West Coast: Wilson & Geo. Meyer & Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—1020 Fourth Ave., So.

H. F. DUNNING: Visual appeal is basis for sound industrial relations.

'How're We Doing'

This week, H. F. Dunning, General Operating Manager of all the Scott Paper Company's Mills, is in the midst of his eighth annual circuit of the company's plants. The object of this trip, as it was of the previous seven, is to report to each and every employee on the company's progress and plans. In informal frank discussions such topics as where the workers stand in pay, how much the company makes and where all the money goes and why are brought up and given thorough treatment.

There's no doubt that these "on-location" talks have become an important part of the industrial relations program at Scott. And the company's labor scene, unmarred by strikes or strife, testifies to the soundness of the program itself. Says executive v.p. R. C. Mateer . . . "the company is fortunate to have this further method of explaining to its workers the operation of their company and their individual importance to it."

Management claims that they send Dunning on his yearly jaunts to "make sure that all employees know all the essential information about the business." And the workers take eagerly to the information and the form in which it is delivered. In fact the program has become so associated with Dunning that a suggestion several years ago to give him a breather evoked a chorus of disappointed murmurings from workers and management alike.

Beginning: Dunning's idea for these hour-long reports to workers blossomed late in 1943 when he was the assistant to Scott's vice president of production. It was based on the contention that "good people make good products" and a feeling that a sense of affiliation with the company on the part of the workers was necessary for progress in both.

In the debut "How're We Doing" Dunning used several charts and graphs to illustrate the salient points of his talk. As the years went on, however, he replaced these with a unique system of trick lights, semi-magic doors and shutters all mounted in a four sided Rube Goldberg type contraption that keeps his audience spellbound.

Visual appeal: Dunning laughingly admits that he is often challenged to come up with some new trick device every year. But he prefers to stand by his now well-known "monster" because of the lasting impression it makes on the visual senses of his audiences. It has the proven value of making otherwise boring facts and figures stick.

The annual junkets set a stiff routine for Dunning. During the present trip he will give his talk 23 times. At some plants of the company it is necessary for him to give his report several times in one day in order to hit all of the shifts and departments. At the home plant (Chester, Pa.) he hit a record of five presentations in one day.

Dunning doesn't often get the break available when he addresses the Sandusky, Ohio plant of Scott. At that site, the smallest of the company, it is possible for him to get his facts over at one sitting of the entire working force.

Financial and wage matters aren't the only topics that "How're We Doing" hits. Safety points are presented too. And in addition a good natured chiding of local inefficiencies and faults (ordinarily taboo subjects for open discussion) often takes place.

From the looks of things Dunning's roving assignment will be a Scott fixture for some time to come. As one official put it . . . "It's a successful plan, it's needed, . . . it's Scott talking to the men and women who are Scott."

OPS Committees

The Office of Price Stabilization is setting up industry advisory committees similar to those of the National Production Authority. The committees will consult with and advise Price Stabilization Director Michael V. DiSalle on industry and business matters pertinent to the preparation, issuance and modification of price regulations and orders.

Procedures for setting up the committees have been announced. The chemical industry advisory committees will be composed of persons holding supervisory, managerial or technical positions in production, distribution or use of chemical products.

Theoretically, for example, a sulfur industry advisory committee could include in addition to a vice-president of a sulfur producing firm, a general manager of a paper mill (sulfur in papermaking), and a director of a farm cooperative (sulfur in fertilizer).

Big and small: Office of Price Stabilization spokesmen say every attempt must be made to assure fair representation for independent small and for medium and for large business enterprises, for different geographical areas, for trade association members and non-members and for different segments of industry affected.

The procedural regulations contained in the defense production act of 1950 permit price stabilizer DiSalle to appoint or disband the committees at his pleasure.

No business or industry representatives except those on the committee will be admitted to meetings unless specifically invited, OPS ruled. But observers believe it will be some weeks before advisory committees for the chemical industry are appointed since even the OPS chemical division is not yet staffed.

•

The Delaney (chemicals in foods) Committee has been reappointed by the new congress and will continue hearings suspended when the 81st Congress adjourned. James J. Delaney (D. N.Y.) will be chairman; committee will include 3 democrats and 3 republicans.

1 HUB OF SYSTEM is central teletype section at Midland. Orders from various sales offices are relayed to manufacturing plants. As the tape goes through the relaying machine a copy is automatically printed—for Midland files.

Dow Teletype Speeds Sales Service

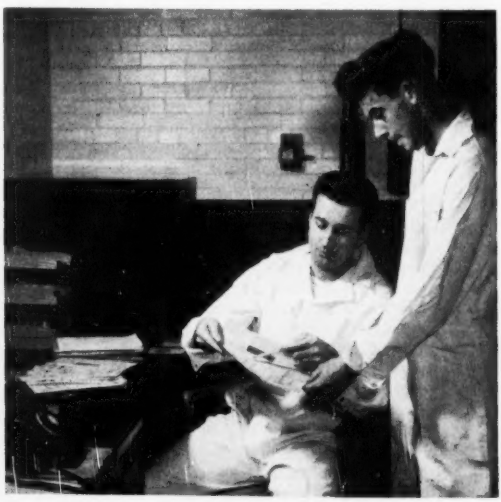
Key to the streamlined service that Dow customers are getting is a unique teletype system. Various sales offices are connected—by teletype network—with manufacturing plants in Midland, Mich. and Freeport, Texas. Originally used by the plastics sales division exclusively, the system proved so successful that it has recently been refined and extended to most of the company's other sales divisions.

Under Dow's private line teletypewriter system, copies of orders are in the hands of headquarters at Midland and the traffic department of the manufacturing plant a few minutes after the order is placed with the salesman.

Automatic sending equipment is provided at points of heavy traffic concentration. In this way, messages can be sent at a rate of 75 words a minute.

The CIW camera observed a typical example of the system in action. A salesman working out of the Chicago office makes his regular call on a paint manufacturer in the area. The firm places an order for 10,000 gal. of Dow Latex 512k to be de-

4 SIMULTANEOUSLY, ORDER IS RECEIVED and printed at Freeport. In a few minutes traffic department will have copy.



5 SHIPPING CLERK INFORMS TANK CAR LOADER of pertinent facts concerning loading and shipping.

2 FIRST STEP: Order from Chicago salesman for Dow Latex is sent to central teletype section at Midland.

3 AT MIDLAND, ORDER IS RELAYED TO FREEPORT, manufacturing plant from which shipment will be made.

livered to its Los Angeles, Calif., plant as soon as possible.

The salesman calls the order desk in Chicago to start the order on its way. The Chicago teletype section immediately relays the order—with shipping date, special handling instructions, etc.—to Midland.

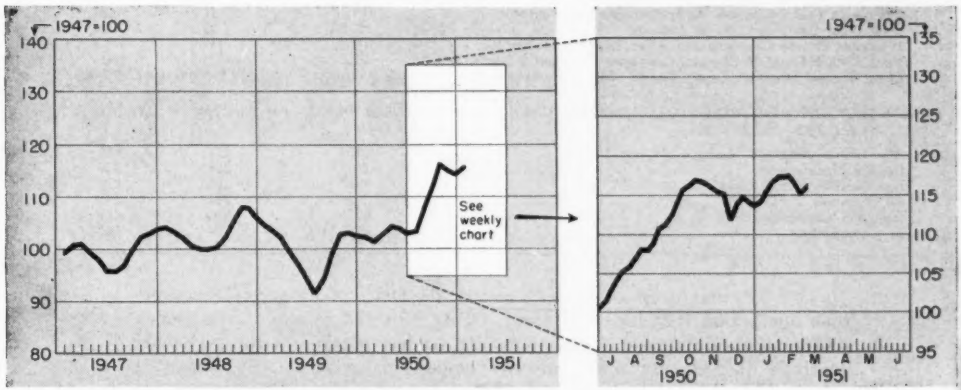
The Midland teletype section serves as the clearing house for all orders from branch offices. The order is received on a tape and the tape is sent to Freeport through a relaying machine. A copy is automatically printed for Midland's files.

As the order leaves Midland, a Freeport machine picks it up and prints it on an order form. A few minutes later the traffic department has a copy and sees to it that the tank car is loaded and readied for shipment. The tank car is loaded and on its way to Los Angeles on the same day the order was placed in Chicago.

The new system, calling for but one typing of the order, eliminates delays at intermediate points. And the customer benefits from faster, more efficient service.

6 THE 10,000 GAL. TANK CAR OF DOW LATEX IS LOADED. On the same day that customer placed order with salesman in Chicago, tank car will be en route to Los Angeles. As soon as tank car leaves, customer will be informed of shipping facts.

CHEMICAL MARKETS....



CHEMICAL INDUSTRIES OUTPUT INDEX—Basis: Total Man-Hours Worked in Selected Chemical Industries

Chief purposes of the International Materials Conference now convening in Washington are: promoting the flow of strategic materials and putting the brakes on soaring costs. Some of the early supply-price problems to be ironed out include copper, zinc, and sulfur.

Even the record production of insecticides and herbicides will have to be pushed to cope with "DO" requirements and urgent agricultural needs in 1951. With a whopping cotton acreage committed for the coming year, only supply re-enforcement on the near horizon is the new DDT plant of Kolker Chemical Works at Houston, scheduled to go on stream this month.

Effects of increasing competition in international trade is being felt by U.S. chemical manufacturers in Europe, South America, and the Middle East. Most of the inroads have been made by the United Kingdom and Germany. While most U.S. producers welcome reasonable competition, they wonder how much of it is indirectly financed by ECA.

Early action by the Office of Price Stabilization is looked for—at least hoped for—in the leather industry, to adjust price differences between leather and hides. So far, ceilings have been imposed only on finished leather, and doldrums have set in until packers and tanners can find a common meeting ground.

Waiting for phenol may be eased as the just-completed Bakelite plant at Marietta, Ohio gets into full production. But realistic users know that demand will continue to exceed supply, will keep a sharp lookout for more.

Few producers have been as uniformly optimistic as the synthetic detergent makers—and with good reason. If it were not for supply shortages, a 75% boost in two years would be expected; even as things stand, a healthy 50% increase is slated.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	116.5	116.0	103.2
Bituminous Coal Production (Daily Average, 1000 Tons)	1,675.0	1,781.0	452.0
Steel Ingot Operations (% of Capacity)	101.0	99.8	70.1
Wholesale Prices—Chemicals and Allied Products (1926=100)	148.5	147.4	115.5
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	222.2	223.7	160.9
Chem. Process Industries Const. Awards (Eng. News-Record)	$79,975,000	$93,894,000	$2,877,000

MONTHLY BUSINESS INDICATORS—PRODUCTION (Index 1935-1939=100)	Latest Month	Previous Month	Year Ago
All Manufacturing and Mining	219	217	183
Durable Manufactures	266	268	209
Non-Durable Manufactures	198	196	179
All Chemicals	286	282	248
Industrial Chemicals	502	500	419
By-product Coke	178	174	156

By imposing a ceiling on cotton, the Office of Price Stabilization took one action that its predecessor, OPA, managed to avoid. The basic 45.76c a pound figure will let commodity traders get reorganized, enable synthetic fiber makers to estimate the competition ahead.

If now-idle domestic mercury mines reopen by agreement between producers and Defense Minerals Administration, look for the present slow descent in mercury prices to drop more rapidly.

With both chemical industry and agriculture in urgent need of sulfur, early restrictive measures to reduce exports can be expected shortly. It is estimated that present export quotas of 200,000 long tons are the difference between a critical shortage and a tight market.

A general tightening up of export restrictions is in progress, as various government agencies plug up loopholes. The Office of International Trade acted this week by reducing maximum value of benzene shipments from $2,000 to $500, and effectively halting all shipments of cobalt and cobalt compounds. At the same time the Commodity Credit Corporation terminated all sales of government-owned linseed oil.

Chemical prices appear to have reached a position of relative stability in a fairly active trading market. Declines numerically are currently exceeding advances, although all heavy chemicals tend to press the ceiling because of unrelenting demand. Fine chemicals and many imports show signs of easing off, with notable exceptions, such as the extremely active citric acid resale market.

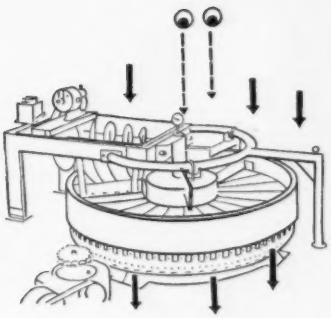
Accompanying the jumbo cotton crop this year will be plenty of cottonseed oil. With record production of soybean oil also slated, a competitive situation might develop late in the year.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending March 5, 1951

	Change	New Price		Change	New Price
UP					
Argols, 100 kilos, 100% basis	$12.00	$40.00	Lemon Oil, Calif., USP	$ .25	$ 4.50
Candelilla Wax, refined	.01	.74	Orange Oil, Calif., USP	.10	2.25
Citronella Oil, Ceylon, drums	.05	2.70	Papeseed Oil, tank cars	.02	.275
Coconut Oil, crude, tank, Pacific	.005	.215	Saffron, Spanish, USP	.25	26.25
Egg Albumen, tech., cryst., bbls.	.07	.94	Tung Oil, imported, tanks	.005	.405
DOWN					
Carnauba Wax, No. 1 Yellow	.01	1.34	Peppermint Oil, redist., USP	$ .30	$ 7.85
Cocoa Butter	.015	.795	Quicksilver, 76 lb. flask	3.00	213.00
Dextrine, cwt.	.17	8.13	Rosin, gum, N.Y., K.M. cwt.	.65	8.80
Eucalyptus Oil (70-75%)	.15	1.30	Tallow, fancy, c.l., delivered	.01	.175
Menthol, natural, USP	.20	13.55	Tin	.015	1.825

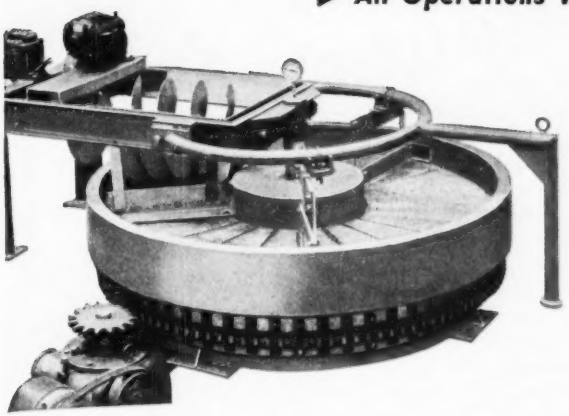
All prices per lb. unless quantity is stated

OLIVER
HORIZONTAL
FILTER



▶ *All Flow Downward*

▶ *All Operations Visible*



YES, with the Oliver Horizontal Filter, gravity aids the flow at all times and the attendant can see what's going on. He's looking down on a horizontal surface and can watch the feed pour onto the filter and the cake form. He can get better washing because the wash has a more blanketing effect and is under better control. And, if desired, washes can be kept separate by means of the multi-outlet valves.

We are offering the Oliver Horizontal Filter as the fastest and highest capacity dewaterer or combination washer-dewaterer for a wide range of crystalline, mineral or fibrous products. Note the list of products being handled efficiently and economically on the Oliver Horizontal Filter. It is a constantly growing list.

We suggest you consider the Horizontal Filter for your problem if the products to be handled are in the general class noted: crystalline, mineral or fibrous. Bring your problems to us, anyway, even if they are not in this class, for we have many different types of filters from which to select. Our experience in filtration is very broad and goes back well over forty years.

Some Recent Horizontal Applications

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Dorr-Oliver S.a.R.L. Milano
Dorr-Oliver, N.V. Amsterdam-C

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Manila

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Honolulu
A. R. Duvall

WEST INDIES
Wm. A. Powe — Havana

SOUTH AMERICA & ASIA
The Dorr Co., New York

AUSTRALIA
Hobart Duff Pty., Ltd.
Melbourne

SOUTH AFRICA
E. L. Bateman
Johannesburg, Transvaal

BOOKS

McGraw-Hill Directory of Chemicals and Producers—1951 Edition. McGraw-Hill Publishing Co., New York, N. Y. 558 pp., $20.

As an accurate index of sources of supply, this directory meets a real need in the American chemical industry. Confining itself to prime producers and manufacturers, this book alphabetically lists all American chemical manufacturers, the chemicals they produce, and the various available grades of those chemicals; refiners and processors are also considered manufacturers.

The directory makes it possible to locate or contact the actual producer of a particular grade or product. Product listings include all chemical raw materials, industrial and fine chemicals, dyestuffs and certain semi-finished products such as synthetic resins and metal powders. Synonyms and trade names are cross-indexed to the most common name, and various grades of each product are listed separately. Also provided is commercial shipping data as to form, packing and shipping points throughout the country. A directory of producers and manufacturers along with their addresses and a breakdown of company divisions make up the final section of this commercial directory.

Effective Management Through Probability Controls, by Robert Kirk Mueller. Funk & Wagnalls Co., New York, N.Y.; xvi+310 pp., $5.

A non-technical book covering every field of administrative practice, this survey shows management—from foreman to president—how statistics can be used to calculate managerial risks, in addition to predicting and analyzing groups of events in a business. From a practical application standpoint, the author deals wth statistical controls in the financial, personnel, marketing, production, and research spheres. This study extends to non-manufacturing phases of business and industry as well as the manufacturing phases, with the purpose of bringing statistical quality control methods into more administrative fields. Thus, the theme throughout is to emphasize how the statistical approach can be utilized in meeting general problems of improvement of goods, services, and performance through better control methods.

Pointing to its successful use during World War II, the author provides 44 actual case histories to illustrate how these methods have furnished increased return-on-investment. Reference sources to technical background information are included to supplement the simplified statistical methods presented.

Chemical Facts and Figures—3rd edition. Manufacturing Chemists' Association, Inc., Washington, D. C. 419 pp., $3.00.

This edition, like its predecessors, furnishes "useful information and statistics relating to the chemical and allied products industries." Covering the period from 1946 through 1949 and part of 1950, the book continues the Association's plan to answer the need for a single publication which would include significant chemical statistics from official sources.

Here are statistics on United States production, sales, imports, exports, and prices of chemicals, chemical products, and chemical raw materials. The present volume also contains available Canadian statistics. Data on 500 new chemicals is given, and a new section on minerals appears. A special section on employment and wages includes data on average earnings, length of work week, number of wage earners, labor turnover and work stoppages.

Analytical Absorption Spectroscopy, edited by M. G. Mellon. John Wiley & Sons, Inc., New York, N. Y.; 618 pp., $9.00.

Nine authorities analyze the problems, methods, and equipment involved in measuring the absorptive capacity of a given sample for radiant energy in the spectral region of 0.2 to 25 microns. Special attention is given to the chemical problem of preparing samples for measurement. Considering all measuring instruments as absorptimeters, the authors cover the physical problems of testing and operating instruments to obtain desired information. Five chapters discuss the different types of absorptimeters and how they are used to determine the nature and amount of a given constituent in a sample; they explain the mechanical, optical, and electrical principles involved and evaluate the applications, merits, and limitations of each method and piece of equipment. A final chapter is devoted to the use of absorptimetric methods to determine the color of objects.

Introduction to Agricultural Biochemistry, by R. Adams Dutcher, Clifford O. Jensen, Paul M. Althouse. John Wiley & Sons, Inc., New York, N.Y.; xii+502 pp., $6.

Presenting the underlying chemical principles affecting plant and animal growth, this text is a revised and up-to-date volume based on a textbook by Dutcher and Haley published in 1932. Divided in three parts, the first section of the book includes data on the history of the development of animal biochemistry in Europe and America, reviews organic chemistry of biologically important compounds, and introduces definitions, terms and mechanisms to the student. Part 2 deals wth chemical facts and theories relating to plant growth, from the time the seed germinates until it becomes a mature plant. A chapter on the chemical aspects of farm chemurgy shows how farm crops can be used for industrial purposes. The final section on "the animal" stresses the biochemical phases of metabolism and growth. The appendix contains reference tables on the chemical composition of some selected human foods and livestock feeds as well as recommended nutrient tables for both humans and domestic animals.

Briefly Listed

TOXICOLOGY OF URANIUM, 333-page survey reviewing the studies performed between 1942 and 1946 on the toxicology of uranium compounds, biochemical effects of uranium poisoning, mechanism of uranium action, and the transport of uranium to the tissues. Edited by Albert Tannenbaum and published by the McGraw-Hill Book Co., New York, N. Y., this book is one of the National Nuclear Energy Series.

AMERICAN STANDARD ABBREVIATIONS FOR USE ON DRAWINGS, revised and expanded 1950 edition for the aid of draftsmen, shopmen, assemblers, and construction men in interpreting industrial drawing done by various companies and branches of the government. Available from the American Standards Association, 70 East 45 Street, New York 17, N. Y., at $1.00 per copy.

LABORATORY OF ELEMENTARY ORGANIC CHEMISTRY, second edition by George Holmes Richter specifically designed to present laboratory exercises of interest to students specializing in the biological sciences. New experiments appear and several procedures have been modified to simplify the technique or improve the yield. 146-page manual published by John Wiley & Sons, Inc., New York, N. Y. Price: $1.80.

HANDBOOK OF PERSONNEL FORMS AND RECORDS, 227-page AMA research report analyzing and illustrating forms and records used in every major activity of personnel administration. Containing forms from over 1,000 representative companies, this handbook provides permanent reference material for companies who are in the process of developing or modifying their records. Can be procured from the American Management Association at 330 West 42nd Street, New York 18, N. Y., at $3.50.

SEARCHLIGHT SECTION

(Classified Advertising)

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Sharples Rotojector MNS 66

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4 Selectro Vibrating Screens, 2'x7', two deck, enclosed, stainless steel.
1 Hardinge Conical Ball Mill, steel liner, 4'6" dia. x 24".
13 Stainless Steel Tanks, Type 316, closed, 50 gal., 80 gal., 325 gal., 425 gal.
1 Rotary Vacuum Filter 8' x 8' Acid Proof, Rubber & Lead.

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15 - 8,000 & 10,000 GAL. R.R. TANKS
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330 W. 42nd St., N. Y. 18, N.Y.

READER SERVICE . . . . . .

HOW TO USE COUPON

Mail the coupon at the bottom of page. Circle page numbers of items about which you want more details. Then write your name and address and mail it to us. Your request will be forwarded to companies concerned, the answer coming direct to you.

MAKES IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items: — Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

EDITORIAL ITEMS

For more data, circle number on coupon

NEW EQUIPMENT

TECHNICAL LITERATURE

CHEMICALS

EQUIPMENT

PRODUCTS ADVERTISED

For more data, circle number on coupon

NEW PRODUCTS

SEARCHLIGHT SECTION

(Classified Advertising)

ADVERTISERS INDEX

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Mail to Chemical Industries Week, 330 W. 42nd St., N. Y. 18, N. Y.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

Editorial Items

21A	24A	40B	40F	40J	40N	
22A	24B	40C	40G	40K	40O	
22B	24C	40D	40H	40L	40P	
22C	40A	40E	40I	40M	40Q	
23A						

Advertisements

I	2a	2c	T3	B3c	8	19	20c	24	35	42a
1	2b	2d	B3a	B3d	17a	20a	22a	28	36	42b
			B3b	4	17b	20b	22b	32	41	42c

Expires June 10, 1951.

BOOKLETS.....

Chemicals

Diethyl Acetylsuccinate
12-p. data sheet containing physical data and chemical properties of this product which is described as a beta-keto ester, and is shown in a variety of reactions involved in the synthesis of a wide range of organic compounds, including many organic acids and ketones. Monsanto Chemical Co.

Colloidal Graphite
6-p. folder on "colloidal graphite as a parting compound" pointing out how colloidal graphite dispersions are made use of in the metalworking, glass, rubber, and corrugated boxboard industries, in addition to giving details on many specific applications. Acheson Colloids Corp.

Adenosine and Guanosine
Revised bulletin reviewing the physical and chemical properties of these compounds and showing how their physiological characteristics are making them increasingly important in biochemical and clinical research. Schwarz Laboratories, Inc.

Aerogel
Data sheet summarizing field test results on the firm's free-flowing aerogel, "Santocel" which indicate that this product may prove to be a controllable additive for the formulation of multipurpose and specialty lubricants. Merrimac Div. Monsanto Chemical Co.

Equipment

Bushing Standardization
12-p. bulletin discussing firm's new standardization program whereby 1000 different types of transformer and circuit breaker bushings have been replaced with 38 standard bushings of maximum useulness. An eight page table lists over 1000 bushings, now in service, which can be replaced by the 38 standard bushings. General Electric Co.

Testing Instruments
32-p. illustrated catalog giving brief descriptions of testing apparatus for the paint, paper, plastics, textiles, rubber and other industries. Factors considered include viscosity, constant temperature baths, film thickness, abrasion, hardness and adhesion, portable gloss and reflection meters, appearance and color, etc. Gardner Lab.

Steam Traps
36-p. revised catalog entitled "Solving Steam Trap Problems" furnishing practical information for engineers, contractors, and maintenance men who specify, install or service steam traps with pointers on selecting traps for all classes of equipment. Photographs, sketches and diagrams show typical trap arrangements, construction and operation. The V. D. Anderson Co.

Liquid Density Control
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